Document of
The World Bank

FOR OFFICIAL USE ONLY

Report No: 22365

IMPLEMENTATION COMPLETION REPORT
(CPL-36550; SCL-3655A; SCPD-3655S)

ON A

LOAN

IN THE AMOUNT OF US$11.0 MILLION

TO

ECUADOR

FOR A

MINING DEVELOPMENT AND ENVIRONMENTAL CONTROL TECHNICAL ASSISTANCE PROJECT

December 26, 2001

Sector Management Unit: Mining Department (CMNDR)
Country Management Unit for Bolivia, Ecuador and Peru (LCC6C)
Latin American and the Caribbean Region (LCR)

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 31, 2000)

Currency Unit = US Dollars

FISCAL YEAR
January 1 December 31

ABBREVIATIONS AND ACRONYMS

ASM	Artisanal and Small-scale Mining
BGS	British Geological Survey
CODIGEM	Corporation for Geological, Mining, and Metallurgical Research and Development
DFID	Department for International Development (DFID, U.K.)
DINAMA	National Directorate of the Environment
DINAMI	National Directorate of Mining
DINAPA	National Directorate of Environmental Protection
DINAGE	National Directorate of Geology
EIA	Environmental Impact Assessment
GIMP	Geological Information and Mapping Program
GIS	Geological Information System
GOE	Government of Ecuador
ICR	Implementation Completion Report
MA	Ministry of Environment
MEM	Ministry of Energy and Mines
MSPSP	Mining Sector Policy and Strategy Paper
NGO	Nongovernmental Organization
PMI	Public Mining Institutions
QAG	Quality Assurance Group
ODA	Overseas Development Administration
PSR	Project Status Report
UAM	Mining Environment Unit
SES	Swedish Environmental Systems
SSM	Undersecretariat of Mines (MEM)
SSPA	Undersecretariat of Environmental Protection (MEM)
SIDA	Swedish International Development Agency

Vice President:	David De Ferranti
Country Director:	Isabel Guerrero
Sector Manager:	Peter van der Veen
Task Team Leader:	Gotthard Walser

ECUADOR
MINING DEVELOPMENT AND ENVIRONMENTAL CONTROL TECHNICAL ASSISTANCE

CONTENTS

	Page No.
1. Project Data	1
2. Principal Performance Ratings	1
3. Assessment of Development Objective and Design, and of Quality at Entry	2
4. Achievement of Objective and Outputs	6
5. Major Factors Affecting Implementation and Outcome	11
6. Sustainability	12
7. Bank and Borrower Performance	13
8. Lessons Learned	15
9. Partner Comments	18
10. Additional Information	20
Annex 1. Key Performance Indicators/Log Frame Matrix	22
Annex 2. Project Costs and Financing	23
Annex 3. Economic Costs and Benefits	25
Annex 4. Bank Inputs	26
Annex 5. Ratings for Achievement of Objectives/Outputs of Components	28
Annex 6. Ratings of Bank and Borrower Performance	29
Annex 7. List of Supporting Documents	30
Annex 8. Borrower's Evaluation Report	35
Map IBRD 24579R	

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

Project ID: P007129	*Project Name:* MINING TECHNICAL ASSISTANCE
Team Leader: Gotthard Walser	*TL Unit:* CMNPO
ICR Type: Core ICR	*Report Date:* December 26, 2001

1. Project Data

Name: MINING TECHNICAL ASSISTANCE

L/C/TF Number: CPL-36550; SCL-3655A; SCPD-3655S

Country/Department: ECUADOR

Region: Latin America and Caribbean Region

Sector/subsector: NN - Mining & Other Extractive

KEY DATES

			Original	*Revised/Actual*
PCD:	04/09/1990	*Effective:*	01/01/1994	07/18/1994
Appraisal:	11/30/1992	*MTR:*	06/01/1996	11/10/1997
Approval:	10/21/1993	*Closing:*	06/30/1999	12/31/2000

Borrower/Implementing Agency: Government of Ecuador (GOE)/Ministry of Energy and Mines (MEM)

Other Partners: Department for International Development (DFID, U.K.)/ Swedish International Development Agency (SIDA, Sweden)

STAFF	Current	At Appraisal
Vice President:	David De Ferranti	Shahid Javed Burki
Country Manager:	Isabel M. Guerrero	Ping-Cheung Loh
Sector Manager:	Peter A. Van Der Veen	Paul Meo
Team Leader at ICR:	Gotthard Walser	Aura Garcia de Truslow
ICR Primary Author:	Sati Achath; Gotthard Walser	

2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

Outcome: S

Sustainability: L

Institutional Development Impact: SU

Bank Performance: S

Borrower Performance: S

	QAG (if available)	ICR
Quality at Entry:		S
Project at Risk at Any Time:	Yes	

3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

The two overall objectives of the project were to: (a) attract new private mining investment and support the systematic development of increased, yet environmentally sound, mineral production; and (b) arrest mining-related environmental degradation and mitigate the damage that results from the use of primitive and inadequate technology by informal miners. The specific objectives included: (a) assisting the Government in implementing its new Mining Law - passed in 1991 - by strengthening sectoral institutions both at the policy and core functions levels; (b) upgrading small-scale miners' technology; (c) instituting applicable environmental standards and a monitoring system; (d) helping contain and possibly detoxify mining-related hazardous wastes; and (e) monitoring mining-related health issues among the mining communities.

The first objective of the project was relevant for the country, and realistic from a technical point of view. In particular, considering the: (a) potential for developing an industrial-scale mining sector producing 10-20 tons of gold per year in the medium term (6-8 years) to meet increasing world demand for gold; (b) the diversification of mining activities, including base-metals from sulfide deposits for producing copper, zinc, silver, and molybdenum; and (c) the possibility of moving the sector from a production of US$115 million in 1991 to more than US$600 million by 2000, the project objectives were fully justified as demonstrated by the results from project studies on the mineral endowment of Ecuador.

The second objective was also relevant considering the mostly informal and illegal artisanal and small-scale mining (ASM) "boom" which had taken place during the 80s and early 90s in Southern Ecuador and, while representing a significant generation of income, had negative impacts on the communities and the environment within the area. In addition, the contamination related to ASM activities represented a potential threat to other downstream activities of prime importance for the national economy, such as shrimp farming and banana plantations, along the southern coastal zone or even to agriculture in some areas of northernmost Peru. However, to "arrest" degradation can be considered to have been a rather optimistic outcome, considering the complexity of socio-economic factors controling the development of ASM activities as well as the time frame required to change cultural, more than technical, attitudes from miners.

The project was consistent with the Bank's country assistance strategy to support private sector development. The project directly supported the Government's 1990 Mining Sector Policy and Strategy paper (MSPSP), developed with the Bank assistance, which stressed the need to facilitate and attract private investment by making Ecuador internationally competitive. The project was also significant for strengthening the enforcement of the new Mining Law approved in 1991, which was the essential building block for the sector development, particularly in terms of providing concessionary rights, restricting discretionary powers, tightening environmental requirement for mining, and creating equality for national and international investors. The Bank's involvement in the project was expected to enhance the Government's ability to administer and enforce the Law, help restructure sector institutions and bring international experience to bear on its new mining program, especially in matters of environmental concern. The Bank assistance was also expected to help the Government mobilize financing, and coordinate and focus activities of bilateral agencies such as Swedish International Development Agency (SIDA) and the Department for International Development (DFID) interested in the mining sector in Ecuador.

The project also took into account three main risk factors. First was the risk of the existing and later Governments seeking an expanded role for the public sector in mining production. To mitigate this risk, the new Mining Law restricted Government operations to special mining zones and reserve areas considered of strategic interest. In addition, the revised Policy and Strategy Document and covenants in the Loan Agreement also addressed this issue. Second risk pertained to the difficulty in changing environmentally

unsound practices being employed by artisanal and small-scale miners. However, some changes were already taking place as better organized small-scale miners were voluntarily upgrading their technology. Third, there was the risk of Government finding it difficult to sustain activities initiated under the project. The project attempted to mitigate the risk by incorporating into the project design activities such as institutional restructuring and development of core functions, which would permit specific and important major activities related to technological upgrading, environmental monitoring, and the establishment of the mining cadastre.

3.2 Revised Objective:

There was no formal revision of the original project objectives, as they are stated in the MOP and the Loan Agreement. However, there was during implementation an important and progressive shift towards the development of processes and activities to increase consultation and participation of the community, civil society and nongovernment organizations in relation to the project and, more broadly, to the mining sector development. This trend followed the growing worldwide awareness during the last decade by communities and companies alike regarding the need of deeper community involvement to optimize the potential contribution of mining to local and reginal socio-economic development (see for example the proceedings of the "Mining and the Community" conference, Quito 1997). There was also increased focus on a multiple and broader use of environmental and geo-information for development and land use management, instead of being mainly focused on mineral sector development.

3.3 Original Components:

The project consisted of the following components:

(A) Policy Management. This component consisted of:

(i) Technical assistance to Ministry of Energy and Mines (MEM) on: (a) application and revision of the Mining Law, Mining Regulation and associated decrees, norms and other related statutory or regulatory texts; (b) organization and operation of mining sector public agencies; (c) relations between mining sector public agencies and nongovernmental organizations and private mining companies operating in Ecuador; (d) minerals marketing, trading and export issues; and (e) taxation and economic matters pertinent to the mining sector.

(ii) Technical assistance and in-service training to National Directorate of Mining (DINAMI) on: (a) legal and procedural issues with respect to the issuance, registration, and termination of mining concessions and processing licenses; (b) accounting, financial and administrative issues with respect to the assessment, imposition and collection of mining royalties and fees; and (c) development, application, and enforcement of mine safety and health standards and procedures.

(iii) Technical assistance and in-service training, with Swedish assistance, to National Directorate of the Environment (DINAMA) on the development, application and enforcement of environmental standards for the mining sector and on the carrying out of its other activities with regard to such sector, focussing inter alia, on (a) the establishment of appropriate organizational and staffing schedules and field inspection procedures in support of such application and enforcement; (b) the design and establishment of effective mechanisms to facilitate the participation of nongovernmental organizations in environmental monitoring and rehabilitation related to mining activities; and (c) the preparation of an institutional reform plan for DINAMA

(iv) Technical assistance to Corporation for Geological, Mining, and Metallurgical Research and Development (CODIGEM) on strategies and mechanisms for: (a) the privatization of publicly-held mining properties or operations and for its divestiture of mining rights in Ecuador; (b) attracting new private sector

investment to the mining sector in Ecuador and upgrading the technical and managerial capacity of artisanal and small-scale miners or enterprises; and (c) aiding mining enterprises or miners with respect to mining safety and health standards and procedures.

(v) Support for the proper execution of the general managerial and technical functions of MEM, DINAMI, DINAMA and CODIGEM through the provision of incremental operating cost funding, office furniture and equipment, and vehicles.

(B) Policy Implementation. These included:

Environmental Management (with Swedish assistance)
(i) Systematic monitoring and establishment of a data baseline of the environmental pollution and occupational health hazards caused by mining.
(ii) Implementation of methods to rehabilitate in a technical and environmentally feasible manner, areas environmentally degraded by mining activity and prevent further environmental degradation.

Geological Information Infrastructure (with British assistance)
(iii) Systematic data gathering, production and publication of regional geological maps at 1:250,000 scale and description reports of an approximately 36,000 km^2 area of Ecuador's Western Cordillera.
(iv) Systematic data gathering, production and publication of regional thematic geo-scientific maps at 1:250,000 scale and reports of an approximately 36,000 km^2 area of Ecuador's Western Cordillera.
(v) Analysis of known ore-districts in Ecuador and use of the results of such analyses to identify and study currently unrecognized ore-districts and propose appropriate prospection methodologies.

Information and Management Systems (with Swedish assistance)
(v) Computerization of CODIGEM's budgetary planning, accounting and control activities, as well as development and operation of mining information system that would provide the general public access to mining documentation and databases regarding mines, mining and metallurgical information and sector statistics, mineral occurrences, showings and prospects and related environmental matters.
(vi) Improvement and implementation of a mining cadastre which will effectively record, monitor and provide public access to up-to-date information such as status of applications for mining concessions, and exact geographical area of concessions.

Assistance to Artisanal and Small-scale Mining (with Swedish assistance)
vii) Provision of technical assistance to artisanal and small-scale mining operations in Ecuador with regard to: (a) mining methodology, environmental safeguards and simple mining economics and reducing environmental contamination; and (b) identification of suitable potential private joint venture mining partners.

(C) Project Coordination Unit (PCU) to manage and coordinate project activities.

3.4 Revised Components:

None of the components was formally revised. However, some of them were refocused, aligning them with the Bank's and country's agenda for stronger focus on mining and environment:

- Institutional strengthening: increased linkage between the institutional component and the development of the technical components.
- CODIGEM: the objectives of the agency - renamed as a National Geological Directorate (or DINAGE) under SSM - were redefined to fulfill the functions of a Geological Survey, as provider of the basic geological information infrastructure (see Text Box 1). Its "corporative" functions, as representant of the State in the development of mining operations, were eliminated and the promotion functions restricted to the national mineral potential and to multi-sectoral information, including environmental

base line, geological hazards and land-use information.

- Environmental management: greater involvement of local communities.
- Geological information infrastructure: increased focus on multi-sectoral information and diffusion of information in relation of the use of it.
- Information and management systems: increased synergies based on a linked cross-sector entities network.
- Assistance to artisanal and small-scale mining: shifting from a techo-economic towards a more comprehensive approach, including legal, management and socio-economic factors.

Geo-information and Development

An important result from the PRODEMINCA project was to provide a clearer understanding of the links between geo-information and the physical and institutional pre-requisites to establish a comprehensive development framework – as well as of the actions to be implemented to improve them through TA projects. The provision of geo-data is fundamental for good governance and to manage, for example, the multifunctional use of space, water resources, health and food security, the environment, natural disasters and other areas. Key principles include:

- The mandate, organization and work programs of government agencies have to be defined or adjusted in order to establish the capacity of public (mining) institutions to provide the information required by the society development needs.
- Civil society organizations and the private sector have to be specifically targeted and actively involved in order to optimize the potential benefits resulting from a proper use of the information.
- The public good nature, broad access and regulations regarding the use of the information should be defined in a clear and transparent information policy statement, agreed upon with all stakeholders.

Text Box 1

3.5 Quality at Entry:

The Quality Assurance Group (QAG) did not do an official assessment of the project's quality at entry. Nevertheless, the ICR finds the quality at entry, on balance, to be satisfactory. As mentioned in the earlier section, the project objectives were consistent with the country assistance strategy and the Government priorities and met the critical needs of the mining sector. In particular, the selected comprehensive approach to sector reform reflected lessons learned in similar recent Bank projects in Latin America as the most effective way to achieve consistent and sustainable outcomes. Since MEM had the technical capacity especially with the help of external consultants, the quality of technical design was generally adequate to meet the project's overriding objective. During preparation of the project, major risk factors were considered and discussed. Stakeholders and cofinanciers were also involved.

However, there were a few design shortcomings. Considering the internal political climate and lack of political stability, the project was ambitious. Multitude of project components (13) and institutional weaknesses on the part of the Government especially the MEM, made the project risky from its inception. There was also a lack of strong enough links between the technical and institutional components. While technical components including environment, geoscientific information, and information systems were implemented by highly competent technical experts with new vision and creative ideas, institutional components had to encounter several barriers, including periodical lack of political commitment and, in a few cases, difficulties to involve professionally qualified people to take care of the implementation.

The project preparation did not identify the risk of fluctuation in commodity prices or the extent of coming national political and economic turmoil. Because of the downturn of commodity prices, as well as

periodical political turmoils, investment in mining activities in Ecuador was not attractive to major exploration companies and they left the country seeking better opportunities elsewhere (this situation apparently started to revert in late 2000). Likewise, the project did not take into account the adverse impact of the worldwide trend in mining activities resulting *i.a.* from the 'Bre-X scandal' in Indonesia and fallout of the East Asian crisis. Many "junior" exploration companies were affected by the dearth of financing available from the stock market consequent to these developments.

In addition, as it appeared gradually, the design and implementation of a consistent communication and participation strategy would have facilitated project activities and involvement of stakeholders and civil society concerned with the project outcome. In particular, this need became evident in 1995 in the cases of ASM and environmental issues as well as, later on, of generation of geological information and could be progressively incorporated into project components.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

The project achieved significant results. Both the legal and institutional frameworks were fully reformed according to best practice and to Ecuadorian specificities (cf. A Mining Strategy for Latin America, WB Technical Paper No. 345, 1996), and they compare positively with other countries on a world wide basis in terms of sector management capacity and investment environment.

- Legal framework. A modern mining Law was prepared and passed (1991) under project preparation and, under implementation, complemented by regulations to enforce it. Furthermore, an amendment to improve the existing Law was passed in August 2000 (as part of the so-called "Ley Trolle II" package) complementing the essential legal components to provide a sustainable and competitive framework for the development of the mining sector. Significant progress regarding the development of more comprehensive consultation mechanisms for the mining sector – an objective identified by SSM and the project in 1996 to respond to the growing awareness that local communities need to be closely involved, and, later, as a consequence of the adoption of a new Ecuadorian Constitution (1998) - has also been made. This will be completed beyond project closure.
- The institutional framework was restructured and capacities were strengthened according to best practice to deal with the functions of a modern State as a regulator of the sector activities (mining and environmental permits) and provider of basic information infrastructure. The role of the State as the owner and operator of mines has been discontinued. The restructuring also meant a rationalization of personnel from about 240 to 120 persons.
- The technical components achieved the initial objectives in a very satisfactory way, including the development of environmental monitoring capacity, the provision of geo-scientific information and multi-sector data bases, sector management systems for mining concessions and Environmental Impact Assessments (EIAs) and improvement of artisanal and small scale mining conditions (see text box 3).

Though all specific project objectives could be achieved, the overall outcomes, more ambitious and less subject to government or project control, would need continued efforts beyond project closure to be fulfilled. The anticipated increase of mining production and diversification were not achieved by year 2000. However, until project mid-term (1997), exploration activities had been growing significantly and an increase in formal ASM gold production from about 1 to 7 t/yr could be observed. But exploration efforts for larger projects did not mature into the development of industrial operations before the onset of the downward worldwide mining trend, which unfortunately coincided with particularly severe national

economic and political difficulties, without mentioning the occurrence of natural disasters such as the El Niño phenomenon in 1998. The situation seems now to be improving again, with the return of major mining companies and a more favorable economic situation. Still, a few years will be necessary to see whether the mining sector develops according to expectations and contribute to improved socio-economic conditions of local communities as well as to the national economy.

Regarding environment, conditions have been set to provide an adequate monitoring of the sector performance and enforcement of regulations, both for large and small scale mining. The project reduced ASM-related contamination, increased environmental awareness among stakeholders and miners, and increased environmental management capacity of small-scale miners and the government (see section 4.2 and text box 3).

4.2 Outputs by components:

(A) Policy Management

Legal framework. The project paid significant attention to the modernization and improvement of the sector legal framework. The existing Mining Law (Law 126) was prepared with the support of the Bank during project preparation and passed in 1991. During implementation, three regulations of the existing Mining Law, namely, (a) General Regulations; (b) Health and Safety Regulations; and (c) Environmental Regulations were prepared and approved by the Executive. A draft new Mining Law, focusing particularly on fiscal, environmental and social aspects, as well as on improved mining rights security of tenure was prepared and was subjected to an open and broad consultation process. It was presented to Congress in the midst of general political difficulties and was not debated. Finally, most of the elements of the draft Law were incorporated in an amendment to the Mining Law and included in the so-called "Trolle II" package, passed by Congress in August 2000.

Institutional Strengthening: The institutional reform went through a process of varying political support during project implementation, depending on the commitment of the successive governments, but regained a positive and decisive momentum from late 1998 until the end of the project. It resulted in: (a) designing modernized mandates, new set-up and functions regarding the management of mining rights and environmental permits as well as the development of the geological information infrastructure; (b) passing of necessary regulations or decrees to establish the reformed framework; (c) elimination of corporate functions of the CODIGEM; (d) rationalization of personnel; (e) establishment of procedures; (f) preparation of operation manuals and training and (g) provision of modern infrastructure. The new set of sector entities - including the National Mining Directorate (DINAMI) and its regional, decentralized representations, the Environmental Mining Unit (UAM) and the National Geological Directorate (DINAGE), all under SSM - was operative by the end of 1999. Through the Ley Trolle II amendment, a mechanism providing reliable funding (a percentage of land fees) to sustain in the long term core functions of the public mining institutions was passed.

(B) Policy Implementation

The main outputs include:

Environmental Management:
(a) Environmental base lines studies in mining areas of Southern Ecuador were completed and results were published and presented at workshops and seminars; an environmental monitoring network and environmental information system were developed which would permit to monitor properly the sector environmental performance.
(b) Building of dams to contain tailings and other works to improve environmental conditions were completed and/or under implementation with the participation of producers in a pilot mining area near the

southwestern coast of Ecuador, where risks and risk perception to impact other important economic activities (shrimps, bananas) are significant.
(c) An environmental management master plan was completed in the Portovelo-Zaruma area to define measures to contain contamination affecting downstream economic activities, including across the Peruvian border.

Land Use Planning and Management

The sustainable use of mineral resource requires that areas of mineral potential are evaluated and managed in the context of existing and alternative land-use options, integrating social, environmental, cultural and economic factors. One of the important achievements of **PRODEMINCA** was therefore to provide tools for efficient and transparent land-use planning and management. Such tools include:

- **Mining cadastre and management of property rights.** The establishment under the project of an efficient mining cadastre – including the regulatory, institutional and technological aspects -, with clear rules, is a key factor to attract and sustain mining investments, to monitor sector activities and optimize the sector contribution to regional development. The granting of mining titles, founded on transparent procedures and on unequivocal location and limits of mineral properties, guarantees the security of tenure for investors. Also, through its display on internet (http://www.mineriaecuador.com), it allows the government administration, as well as communities, to foresee and mitigate potential conflicts between mineral resources exploitation and other land-uses, including conservation of protected areas.
- **Geo-scientific information infrastructure.** The availability of strategic information with respect to mineral resources constitutes an important mandate of a modern State, through a national Geological Survey Organization. The Government of Ecuador and the World Bank has long recognized the importance of a Geological Survey as an "enabler" to provide the required data to make well-informed decisions regarding sustainable land and resource use. PRODEMINCA allocated funds to strengthen the Ecuadorian Directorate of Geology (DINAGE), to develop the national multi-disciplinary geoscientific data base, to set up a related information system, and publish and disseminate the information through maps, books, workshops and conferences. The availability to all stakeholders of modern and reliable geo-scientific data enhance the capacity not only to assess and manage mineral resources, but is also applicable to agriculture, forestry, natural hazards, environmental and health risk analysis, conservation and land-use planning.

Text Box 2

Geological Information Infrastructure:
(d) 100% of the planned regional geological, geochemical, geophysical and known ore districts maps, descriptions and data bases were generated and published until June 2000. These state-of-the-art maps and data bases are utilized for land-use planning and management as explained in Text Boxes 1and 2.
(e) A series of books and brochures have been published (see annex 7) and workshops organized to inform civil society organizations, universities and schools and the public at large on the potential uses of the geo-information in relation to development and land use management.
(f) In response to the concern of stakeholders on the use of geodata (see below), a formal system to monitor the use of such data has been put in place, which would function beyond project closure.

In December 1999, a complaint was filed with the World Bank Inspection Panel by two Ecuadorian environmental NGOs against the geological thematic mapping activities in and around a protected area in Northern Ecuador (see section 10). The complaint asserted that the local communities were likely to suffer harm as a consequence of this work and of the related Bank failures and omissions in the design and supervision of the project. Specifically they claimed that the development of mining activities in the area

would prevent local communities from continuing to work in their traditional agricultural and cattle breeding activities, and that the project would have a destructive impact on critical natural habitats, threatening protected natural reserves and endangered species. An investigation was subsequently initiated in May 2000 by the Bank's Inspection Panel which, while identifying shortcomings in the project EA preparation, concluded that thematic mapping was environmentally neutral. This process led also to indirect positive outcomes, such as the statement of a clearer definition of information policy by the Governement (mainly MEM and ME), and an increased awareness by public authorities on the need to improve consultation and participatory processes involving local communities in relation to the development of mining operations. Activities in that sense have been initiated and will continue beyond project closure, with the support of the Bank, including the development of guidelines related to relationships with communities as well as monitoring by environmental NGOs of the use of geological data in relation to activities in protected areas.

Information and management Systems:
(g) A sector Geological Information System (GIS) and related data bases were developed and are operational.
(h) A computerized Mining Cadastre Administration System (SADMIN) was developed and is operational in all DINAMI's central and regional offices.The information, updated daily, is available on internet at http://www.mineriaecuador.com. One output of particular interest is a map showing the distribution of mining concessions and of protected areas. SADMIN is linked to the environmental data bases (see below).
(i) A computerized information and management system related to environmental permits and environmental baseline data.
(j) An Inter-ministerial Decree between MEM and ME defines an Information Policy regulating the distribution and use of information.

Assistance to Artisanal and Small-scale Mining:
(k) Achievements include complete formalization of the sector, improved managerial, technical and environmental performance of small-scal miners and reduced contamination. (See Text Box 3).

4.3 Net Present Value/Economic rate of return:

Formal net present value or economic rate of return are not appropriate measurements for this technical assistance project since it was never directly linked to an investment project.

4.4 Financial rate of return:

Not applicable

An Integrated Approach to Improve Artisanal and Small Scale Mining: The Ecuador Case

Artisanal or Small Scale Mining is an activity largely driven by poverty in combination with other socio-economic factors (e.g. climatic events affecting agriculture, commodity prices and others). It is typically practiced in marginalized and remote rural areas by poorly educated people with little other employment alternatives. Today, an estimated 13 million people in about 30 countries across the world are small scale/artisanal miners, with about 80 million to 100 million people depending on such mining for their livelihood. Miners and their families expose themselves to harsh working conditions for minimal income in a high risk context, endangering their health as well as often the surrounding environment. Conflicts with surrounding communities are frequent. Much of the actual economic potential is lost due to the absence of a legal or fiscal framework for small scale mining and due to rudimentary production, processing and marketing techniques. An artisanal mining boom in hard rock gold involved more than 50,000 miners in the southern regions of Ecuador during the 1980s, which, by the early 90's, had caused considerable damages affecting the environmental and social situation of the miners and the communities living around.. Building on the lessons of a workshop held at the World Bank in May 1995, the PRODEMINCA project decided to shift from an originally mainly technical approach towards a **fully integrated program**, with the active participation of the miners themselves and of local communities, addressing the environmental and social problem, including migration and gender issues. The project made a significant contribution to:

- Largely formalizing the activity: 166 associations of the 169 groups existing before 1995 have now been granted a legal title and land invasions by small scale miners did not occur during the last years.
- Developing sustainable remedial measures to limit the environmental degradation caused by small scale mining, controlling the occupational and toxicological problems related to mining, including for example, building of a pound collecting the tailings of 22 of the existing 50 ASM plants upstream the Ponce Enriquez village, instead of discharging them in the river; improvement of metallurgical processes: about 40% of plants are now using the more effective cyanidation process; introduction of gravimetric devices in most operations; reduction of mercury use (for example there is an estimated use of 1 to 2 kg of Hg per recovered kg of Au, instead of an estimate of 8kgHg per kgAu in Peru); development of local equipment (e.g. retort); re-forestation and other works; training in safety and occupational health; building of a health center specialized in mining originated diseases.
- Facilitating the organization (including the establishment of an ASM Chamber of Mines), management and technological training of small scale miners, supporting the establishment of sector associations and small enterprises, with the view to up-grading the efficiency and performance of the sector.
- Involving local communities in the monitoring of environmental and socio-economic impacts from mining (e.g. creation of community and miners environmental committees).
- Facilitating the development of alternative economic activities.

The project was also instrumental in setting up a network among NGOs, other agencies working on small scale mining and government authorities with a view to taking a systematic and collaborative approach in addressing the issues. (Adapted from R. Hoffner, 2000, SES final report).

Text Box 3

4.5 Institutional development impact:

The project's institutional development impact was substantial. The mandates, responsibilities and functions of the different public mining institutions (PMIs) in charge of sector management have been modernized and clearly defined (including within the Mining Law, its amendment and regulations). They now correspond to the role of a modern State as a regulator of the activity. The operating functions which remained in the 1991 Law have been eliminated (amendment to the Law, 2000). Mining areas which were under the control of the State were being released at project closure.

The process of institutional reform lost momentum during the period August 1996 to August 1998, due to

weaker political support. However, commitment under the subsequent administrations regained strength and consistent efforts were made to achieve the reform, modernization and sustainability of the PMIs (see section 4.2, paragraph on Institutional Strengthening above). These developments embraced international best practice and were designed to fit the specificities of the Ecuadorian mining sector in terms of functions, size, capacities including a personnel rationalization from 240 to 120) through: (a) both formal and on-the-job training; (b) infrastructure remodeling and rehabilitation of offices; (c) acquisition of modern equipment (e.g. installation of GPS base stations over the country) and establishment of computerized information and management systems; and (d) decentralization - strengthening of regional offices for administration of mining rights and environmental monitoring. Though the institutional reform process started late in the project life, the objectives could be achieved through an extension to the loan closing date which was specifically designed to this effect.

The institutional developments which impacted the entire mining sector were the modernization of the *Subsecretariat of Mines* (SSM), as head of sector and responsible for sector policy and performance monitoring. Under SSM, the *Environmental Mining Unit (UAM)* was created, responsible for the evaluation of EIAs, administration of environmental permits and monitoring of environmental performance, as an interface between the mining operators, DINAPA and the Ministry of Environment. The *National and Regional Directorates of Mines* (DINAMI), responsible for the administration of mining rights, was modernized. CODIGEM was restructured as: (i) the *National Directorate of Geology* (DINAGE), responsible for the development and diffusion of the national geo-scientific information data base; and (ii) *Mining Information System Unit* (USSIM) which serves all PMIs and is responsible for the maintenance and updating of the information and management systems, including the intranet as well as the internet interfaces.

On the negative side, civil service conditions, which apply to the overall State administration, could not be improved and this might affect the continuity of services of staff who have been trained under the project and quality of staff to be recruited in the future. Efforts were made to include the PMIs as a pilot into the Modernization of the State T.A. Project (MOSTA). However, such initiatives did not yet result in a change at the Government level.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

Steep decline of commodity prices in 1998, which made investment in mining activities in Ecuador no more attractive to major exploration companies, was a major factor affecting project implementation. Likewise, lack of financing resulting from the Bre-X scandal in Indonesia and fallout of the East Asian crisis during 1997-98, made it difficult for many "junior" exploration companies to conduct mining activities in emerging countries such as Ecuador.

5.2 Factors generally subject to government control:

Because of initial delays, including the setting up of a proper project implemention unit, the loan became effective only in July 1994, with a delay of about nine months. The project had a slow start also because of the need to finalize cofinancing arrangements with the DFID and SIDA for the environmental monitoring and control components.

During the period August 1996 to February 1997, disagreements over project implementation strategy and political interference in project management also put the project on hold. There was a slow-down in disbursements and a build-up in disbursement lag due to resurgence of frequent political interference and uncertainties. From mid-1996 to end-1998, recurrent changes of governmental and sector authorities, with

the corresponding variations in identification with project objectives, resulted in a lack of commitment to institutional restructuring, which adversely affected the implementation.

5.3 Factors generally subject to implementing agency control:

Lack of cooperation from National Directorate of Environmental Protection (DINAPA) to the project was a factor which delayed start up of environmental component activities. While DINAPA was allocating more resources to hydrocarbon and electricity subsectors, mining sector was almost neglected and deprived of human and financial resources. However, halfway through the project (1997), with the arrival of a new team at DINAPA, the Bank could start dialogue with them to finalize environmental regulation and start work of the institutional reform..

CODIGEM, on the other hand, did not want to give up its corporate functions. It was more interested to focus on mining activities and exploration rather than in geological activities and consequently, it was reluctant to release mining properties right. CODIGEM did not also participate actively with BGS in the mapping activities. Until its transformation as DINAGE in 1999, CODIGEM's lack of identification with project objectives affected project implementation.

5.4 Costs and financing:

The total cost of the project executed at closure amounted to US$20.55 million. This is about US$3.45 (-14.4%) million less than the US$24.0 million estimated in the MOP. The Bank's Loan amount was reduced by $3 million from $14 million to $ 11 million through a partial cancelation in November 1998, in view of the expected closure of the project on June 30, 1999, and delays in the institutional reform process and in the implementation of important works such as an airborne geophysical survey and building of tailings dams. However, all project objectives could be achieved through subsequent extension to the loan closing date and reduced implementation costs, including: (i) lower cost than originally estimated for the aerial survey; (ii) selection of a different approach to finance the construction of tailings dams and other environmental remediation works; and (iii) more extensive contracting of national consultants, instead of international ones as originally planned, (particularly regarding the legal and institutional reform process as well as the environmental and assistance to small-scale miners activities and others).

The availability and delays in obtaining counterpart funds has been a problem during most the project life, particularly during the Bucaram and Alarcon administrations. While this resulted in implementations delays, this difficulty did not endangered project activities. In addition, a few initiatives mitigated this problem, including a pro-active support from the team under the Swedish grant, which helped to bridge gaps in critical periods, particularly at the early stages of the project. And, considering the importance of the social components of the project as well as the particularly severe national economic crisis at this moment, an amendment was processed in September 1999 to reduce the percentage of the government contribution (as reflected in Annex 2) and allowed a smoother implementation during the final stage of the project. Consequently, fund flows problems did not significantly alter project implementation.

6. Sustainability

6.1 Rationale for sustainability rating:

By virtue of reforms in the Mining Law, the sector institutions had the access to dedicated funding which will enable to achieve in the long term the project objectives, including sector management capacity, as well as maintain and renovate the necessary infrastructure established under the project. Restructured institutions with specific roles and without corporate functions have improved the systems and procedures. It is estimated that while the income generated through the payment of land fees has gone up by more than

one million dollar per year, expenses have been reduced by more than $2 million dollars in 1999 and by more than $800,000 in 2000. The sustainability is also strengthened as a result of the training imparted to the institutional staff under the project, as well as by legalizing about 98% of the small-scale miners and artisans and bringing them under the formal system.

If there would be sufficient mining activities going on in Ecuador, DINAGE, DINAMI, and the Mining Environment Unit (UAM) will derive necessary resources from mining concessions, service fees, and state financing, which would ensure their sustainability. The sustainability will also remain highly dependent on the prices for mineral commodities on international markets. Increased participation of local communities, especially for environmental monitoring, is also an important factor for ensuring sustainability. However, sustainability could be affected if the current economic and fiscal crisis gets worse.

In addition, to fully achieve sustainability of the mining sector in the long range, there is a need to complete the design and implement mechanisms ensuring participation of local communities in mining development. Activities related to this objective have been initiated under the project but would likely need further support. Also, to take full advantage of geo-scientific, mining and environmental information and promote a responsible use of it, there is a need to continue (i) linking of information and management systems between sectors, principally between the MEM and the Ministry of Environment; (ii) monitoring the use of geological and mining data; and (iii) informing users at a national level and promote awareness regarding the responsible management of the data. In addition, considering the increasing political decentralization taking place in Ecuador, an adequate cooperation needes be established between the ME, SSM and local governements (municipios and provincial councils) to maintain consistent environmental norms at all levels.

6.2 Transition arrangement to regular operations:

The successful transition to regular operations is facilitated by the fact that the reformed PMIs and the management systems were operational at project closure and the legal framework, through the 2000 amendment to the Mining Law, includes the allocation of funding from the annual land fees to surface and mining rights for the operation of the PMIs core functions. However, political stability and overall improvement of civil service rules are crucial factors to ensure the sustainability of the project outcomes.

7. Bank and Borrower Performance

Bank

7.1 Lending:

The Bank's performance in the identification of the project was in general satisfactory. It was consistent with the Government's development strategy and the Bank's assistance strategy for Ecuador. The Bank was proactive in initiating the dialogue with the Government, cofinanciers and the MEM for the sector reform. The Bank had a good skill mix, and had a good working relationship with the Borrower. The project preparation was also well organized, systematic, and satisfactory. During the project appraisal, the Bank assessed the project's risks and benefits and they were highlighted in the project documentation. However, considering the project was a "A" environmental category, the project would have benefited of a more robust and expanded EA process.

7.2 Supervision:

The Bank's performance during the implementation of the project was satisfactory. Over the six years of project implementation, there were 28 supervision missions, about 4.5 missions per year. As stated in the Inspection Panel report summarizing the findings of its investigation on the mapping component of the project (see section 10), "the Panel found that frequent missions were undertaken and that there was

considerable follow up by the Bank on outstanding issues.Moreover, it appears that the composition and scope of the missions evolved with Project requirements". The Bank's supervision teams included mining engineers and specialists in mining sector, energy economics, environment, operations, anthropology, sociology, and law. They worked closely with the Government, cofinanciers, stakeholders, and the implementing agencies and their working relationship was cordial and productive. Outside consultants were used for specific aspects of certain project components, especially in environmental aspects of the project. Aide-memoires were regularly prepared and transmitted. The Bank provided comments to the studies conducted under the project. The Form 590s and Project Status Reports (PSRs) realistically rated the performance of the project both in terms of achievement of development objectives and project implementation.

Throughout the implementation of the project, consultation meetings, seminars, presentations and other activities were organized for Nongovernmental Organizations (NGOs), local communities, and the public at large. These events in general were useful to convey project objectives, activities and results. In addition, if project activities concerned a particular community, the local authorities were fully apprised as, for instance, was the case in the Intag region, where meetings were held with the mayor of Cotacachi in March 1998 and with the population of the Intag area at a popular assembly in April 1998.

7.3 Overall Bank performance:

Overall, the Bank performance was satisfactory during project preparation, appraisal and implementation.

Borrower

7.4 Preparation:

The project preparation which started in 1989 was finalized only in 1993. During these four years, the Government commitment fluctuated with the frequent changes in sector Minister and Undersecretaries, as well as with the change in Government Administration in 1992. While the project received strong commitment during 1989-91, as demonstrated by the preparation and passing of a new Mining Law (Ley 126), and again in 1993, the commitment was lacking during 1992 and most of 1993. However, the government officials and staff of implementing agencies worked closely with the Bank's project team on a continual basis throughout preparation period.

7.5 Government implementation performance:

The Government changed five times during project implementation and this situation affected both commitment and performance. From 1994 to 1996, the authorities were fully committed to the project and its mining development strategy was consistent with the project objectives. The modified Mining Law, the Health and Safety and the Environmental regulations for mining activities were ready by the end of this period (August 1996).

During the period 8/1996 to 2/1997, the government was only partly supportive of the project objectives. For example, while not opposed to private sector involvement in mining sector, it reversed the process of release of areas controlled by CODIGEM, initiated under the previous period. With respect to implementation objectives, it was less interested in long-term development measures, such as institutional capacity building. Instead, it was more keen on meeting immediate and short-term objectives, for example the building of tailings dams. From February 1997 and until August 1998, the Government commitment to the project objectives was restated and progress in reforming the legal framework were made. In August 1998, a strongly committed team was appointed to manage the sector and more decisive actions to achieve the project objectives were initiated. This team, with minor changes, and overall commitment were maintained until project closure, albeit with a somewhat lesser commitment towards environment which did

not, however, translate in reversing legal and institutional progress within this field.

In general, except during the 8/1996 to 2/1997 period, despite the difficult economic, political and social conditions, the Government has shown resolution and commitment in putting through the institutional and legislative reforms contemplated under the project. The Government also placed a high priority on strengthening mechanisms and guidelines for consultation processes with local communities. Building on the consultation requirements of the environmental regulations for mining activities (September 1997), the Government designed a program to broaden the scope of the process, including socioeconomic and cultural aspects, design mechanisms and guidelines and support the systematic implementation of consultation and information processes. This is expected to contribute to further strengthen the sustainability and the integration with local communities of mining in Ecuador, and provide useful lessons and experience for other sectors.

Compliance with some of the loan covenants were affected for sometime by delays in privatizing Portovelo mine and releasing CODIGEM-held mineral areas to private investors. There were also initial problems regarding persistent shortfalls of government counterpart funds, logistical support, and physical resources required for project implementation.

7.6 Implementing Agency:

The project was identified as risky in view of the lack of consistency in commitment at the MEM to sector reforms during the 1996 to 1998 period. During this time, many project-related issues were caused by the MEM's Mining Subsecretariat's inadequate policy coordination and not fully open attitude toward public discussion and consultation with stakeholders.

Two of the implementing agencies also demonstrated weak commitment to the project objectives which contributed to implementation delays and uncertainties. DINAGE was reluctant to concentrate on its geological survey role and to give up any corporate functions. DINAPA, which had continued to be the weakest project entity, played a more active role in project implementation after the mid-term review; and supported the creation of the sector Environmental Unit (see Section 4.5).

The Government had a good project coordination unit and the day to day implementation of the project was relatively smooth. The PCU dealt with procurement, disbursement, progress reports, and in maintaining proper records of the project. During the entire implementation period, there were only two project coordinators (1994-1995 and 1995-2000) and this ensured stability at PCU. In the initial stages of the project, PCU's performance was satisfactory in administrative matters, but was not fully satisfactory in matters related to (a) the implementation of the more complex institutional reform, requiring inter-institutional cooperation and multi-disciplinary approach, partly because of weaknesses of institutions primarily responsible for these tasks; (b) selection and monitoring of consultants, partly because of pressures exerted by government agencies to hire specific individuals who were not fully committed to the project objectives; and (c) project accounting. However, based on the recommendations made under the mid-term review, these deficiencies were subsequently addressed in a very satisfactory manner and the PCU, in close coordination with the SSM and MEM and functioning as an interface between all project stakeholders, played a proactive and critical role to achieve the projects objectives and their sustainability.

7.7 Overall Borrower performance:

The overall performance of the Borrower was satisfactory.

8. Lessons Learned

- **Sector development should be part of an overall political and economic reform.** Beyond

commitment of sector authorities, an important risk to assess during project preparation and implementation is the consistent integration of sector development within an overall economic reform, and the continued political support to implement the needed legal and institutional changes. In Ecuador, sector reform has been successful, but has not -yet - fully achieved its foreseen outcome in term of sector foreign investment and related growth indicators. This is due partly to the perception investors have regarding political stability and government overall commitment to economic opening. Indeed, the evolution of this situation through time may have been difficult to assess at project preparation, and has also varied strongly during implementation. Improved coordination between Bank's projects might help to facilitate dialogue with and leverage on the Government. This applies as well to cross-sectoral issues, for instance regarding civil service reform, infrastructure and, in particular, regarding the set up of umbrella and sector environmental management agencies.

- **Integral approach to sector development.** The Ecuador Mining TA provides another good example of the importance to approach sector reform in an integrated, instead of a piecemeal way. For instance, the demonstration of the country mineral endowment through the publication of mineral information would be of little use for sector growth without the development of an enabling legal and institutional environment for sector investment and of institutions in capacity to properly administer mining rights and monitor environmental performance. This approach applies as well at the sub-component level, as illustrated in text boxes 1 and 2 in the case of the development of the mining cadastre and assistance to small-scale mining, respectively. The coordination with the Government and with co-financing agencies (SIDA and DFID) has been particularly useful in that sense to ensure the success of the project..

- **Communication, consultation and stakeholders participation**. The preparation and implementation of mining TA programs require today the development of a consistent **social strategy**. Sector reform technical assistance projects and outcomes may be perceived by government authorities and by Bank staff - and other donor organizations - as of neutral character in terms of social and environmental impacts, direct or indirect. The PRODEMINCA experience demonstrates that in the case of mining TAs, and most likely of other extractive industries as well, such a perception may not be shared by the civil society at large, particularly by indigenous or local communities, NGOs and other stakeholders who might feel their values or resources are potentially threatened by a development process induced by such projects. It is therefore critical to design and implement during project preparation and implementation a more systematic social strategy, including improved information and consultation participatory processes, which should be continued by the governmental sector authorities in the longer term. The social strategy should include the definition of actions to be carried out jointly by government authorities and civil society organizations. The ultimate goal would be to optimize stakeholder participation and consensus with respect to sector development objectives and outcomes, and consequently ensure a more sustainable and improved contribution of mining to society.

- **Geo-scientific information management**. The geo-scientific information, as generated under the project, represents a very valuable tool not only for sector development but also for land use and related potential conflicts management. In that sense it is important at the project preparation stage to define and identify (a) the type and characteristics of information which should reflect the **public good** nature of the information to be generated and managed, as corresponds to the mandate of public geological institutions (e.g. environmental, geological, geochemical and geophysical databases); (b) a series of concrete and useful products to be generated for identified audiences, instead of general "studies"; (c) channels to make these products openly and easily available to potential clients and to the public in general under appropriate formats (open files, publications, including popular editions, CDs, internet web sites) at a nominal cost, (d) activities to inform and train, at different levels, all potential users on how to use the information and (e), activities to monitor the use of data which could be misused.and cause negative social or environmental impacts (e.g. exploration in protected areas).

Another important lesson from PRODEMINCA is that issues related to the generation and use of geo-scientific data must be part of the project social strategy and consultation process.

- **Assistance to artisanal and small-scale mining.** The project has been rich in lessons on how to address artisanal and small-scale mining issues, demonstrating particularly the importance (i) to use an integrated approach and (ii) to emphasize the socio-economic aspects related to the sub-sector situation. The key lessons are summerized in Text Box 2 below.

- Though the actual impact still need to be more systematically documented, the contribution of similar integrated ASM activities to **poverty alleviation** and socio-economic improvement on populations in peripheric mineral rich areas with few alternative economic options is important. With this purpose in mind, the Bank, together with DFID, has recently taken the initiative to establish a Consultative Group for Artisanal and Small Scale Mining (CASM) aiming at gathering and disseminating experiences within this field and promote and coordinate amongst donors the development of integrated approach projects. Many countries in the LAC, Africa, South Asia and other regions would certainly benefit of such projects (see also http://casmsite.org/).

- **Capacity building and foreign vs. national consultant services**.The involvement and balance of foreign versus national expertise in project activities is an issue much debated with respect to TA capacity building impact and sustainibility. Under the project, the involvement of long-term foreign specialists, most of them funded by DFID and SIDA, has without any doubt contributed to implementation stability and to introduce cutting edge methodologies and technologies. However, the priority given to the incorporation of a much larger number of national consultants (both firms and individuals) than originally envisaged has certainly helped to insert the project into the Ecuadorian reality - a fact clearly demonstrated in the case of the small scale mining activities -, and will contribute to the sustainibility of the project results. Particularly positive synergies between national and foreign expertise have been developed within the fields of institutional reform, environmental management, assistance to small-scale mining and set up of information systems. In that sense, the performance of the team financed under the SIDA grant, and promoting a real participatory attitude, has to be commended.

- In addition, the cooperation with and involvement of technical departments of Ecuadorian universities in several project activities - for example assistance to small-scale miners - and the organization of courses sponsored by the project (i.a. the Mining Environmental Management one year post graduate course organized at the EPN in Quito). While the sustainibility of these activities as such cannot be garanteed in the long term, they had the benefit to expose the next generation of mining specialists in Ecuador to modern concepts.

- **Commitment to institutional reform**. Sectoral institutions and their staff need to develop a strong commitment to reform and acquire a full sense of ownership and responsibility for the project. It is therefore important to allocate at an early stage sufficient resources and time to convey to the institutions staff the relevance of the project objectives to their sustainability through workshops, consultations, staff training and exposing them to best practice and experience in countries in the Region where reforms are further advanced. However, a vital pre-requisite is a full and sustained commitment by government authorities.

- **Institutional strengthening and capacity building**. Activities related to institutional reform and those aiming at developing the institutions technical capacity need to be linked into common components, instead of separate ones as under the PRODEMINCA case, in order to optimize synergies between the two sets of modernization tasks. For example, a closer integration of the mapping components into CODIGEM - later DINAGE - work program would probably have facilitated the reform of the

institution as well as the smooth transfer of working methodology.

- Intensive monitoring and **supervision** are essential for sectoral reform TA project, especially when the design is complex, counterpart institutions are weak, and political uncertainties or turmoil frequent. Supervision should therefore be given the appropriate priority from inception and be maintained during the project life. Beyond the follow-up of procurement, disbursement, legal and other administrative matters related to project implementation, the Bank supervision must emphasize the appropriate provision of advisory support in sectoral policies, legal/institutional framework, and technologies and maintain a constant effort to dialogue with changing involved parties. In addition, to enhance effectiveness, co-financiers should be closely involved in these efforts.

- **Trust** could be established at an early stage and maintained during implementation between the Project Coordinating Unit, most of the succesive governments sector authorities, many stakeholders - e.g. small scale miners - and the Bank's project team.This permitted to engage a constructive dialogue which contributed to the reform success despite frequent political and economic turmoil. It also allowed to implement procurement, disbursement and other procedures in a relatively smooth way under sometimes challenging circumstances.

- The **project coordinating unit** has played a key role in the success of the Project. Staff constituing a relatively small team of 5 persons had been selected by the Governemnt through open competitive procedures and on the basis of management and/or technical competence and experience, instead of political allegiance or of partisans' agenda. More important maybe, the PCU demonstrated the capacity to command professional respect from the succesive governments sector authorities and to maintain an acceptable stability in project implementation and development objectives.

9. Partner Comments

(a) Borrower/implementing agency:
As described in more details in Annex 8, the Project has been successful in establishing sector conditions conducive to private mining investments as well as an institutional and information framework permitting an adequate development, monitoring and enforcement of regulations regarding mining activities from the legal and environmental point of views. While the overall political and economic situation is slowly recovering, after years of turmoil during project implementation, mining investments are picking up again, as a result of the project achievements.

The social, environmental, legal and technical conditions in the artisanal and small-scale mining sub-sector have also strongly improved compared with those which prevailed a decade ago. For example, 166 of 169 small-scale mining groups are now legalized and invasions of mining properties by illegal miners did not occur during the last years; local community driven environmental committees have been established in two important mining districts; the use of mercury is progressively replaced by better controlled cyanide operations; and the build-up of improved containment facilities for tailings is spreading.

Constraints encountered were mainly related to the country instability during project implementation and the varying grade of political support towards the legal and institutional reform, which could only be completed during the final two years of project activities. In that sense, the stability of the project coordination unit, as well as the continuous support of foreign consultants funded under Swedish and British grants have contributed to the achievements of the objectives. An important lesson from the project is the need to design and implement a social and communication strategy aimed at (a) a more comprehensive participation of the community in relation to sector development ; and (b) the inclusion of better defined socio-economic components to improve the conditions in the artisanal and small-scale mining sub-sector. Other lessons include: permanent staff (such as in components related to information systems, environmental management and small-scale mining) rather than short term contract staff (e.g. under the

geological mapping components) should act as counterparts to technical experts to ensure that capacity building remains within the agencies; and national consultants should be hired as technical experts whenever possible in order to enhance the sustainability of project activities at large within the country.

Sustainability of the sector institutions and their core functions could be strengthened under the reformed framework, including the provision of adequate financial resources. However, this sustainability – as well as a full development of the sector according to Ecuador mineral potential - will also depend in the future on the continued national political and economic stability. The challenge now will be to sustain activities – and, to identify sources of financing - to support the continuous improvement of (a) the environmental performance of small-scale mining (e.g. the implementation of the environmental mitigation works in the border area with Peru; and (b) relationships between the communities and mining development.

(b) Cofinanciers:
Comments received from DFID:

The ICR identifies, there seems to have been a significant delay following project implementation before environmental and institutional development issues were tackled by either WB or DFID. Little seems to have been done on these issues in the first 3 years of the project. Whilst this is in some measure due to institutional issues in Ecuador at that time, with several changes of government occurring and the Ministry of Environment being temporarily disbanded, neither WB or DFID appeared to be pro-active in tacking these issues during the early stages of the project. A more pro-active approach was taken during the final 2 years of the project

Whilst it is true to say that the project now has had successful outcomes, the impacts could have been further improved, particularly on the institutional development aspects, had more concerted action been taken at the outset of the project rather than in the latter half of the project.

DFID supported the project by providing technical assistance for the implementation of the Geological Information and Mapping (GIMP) component of the project. Although geological thematic mapping has a myriad of uses, not least for baseline environmental conditions determination and water resources development, thematic mapping has been perceived by a number of stakeholders as being wholly focused on mineral resources mapping for mineral exploitation purposes. Whilst thematic mapping is not mineral resource exploration, it does provide indicators which can be used to develop an exploration campaign. Internally, until the last two years of the project, little consideration seems to have been given to communication of non-minerals exploitation uses for thematic mapping data, with a focus being purely on data collection and building the thematic maps and feeding information into the other technical components (such the mining cadastre and geological website). Although this approach was in line with fulfilling the terms of reference, in hindsight, such a narrow approach, which did not appear to address the concerns of non-geoscience stakeholders, seems to have been misguided. This lack of proactive communication with stakeholders has to some extent lead to the problems which resulted in the World Bank Inspection Panel investigation. Although measures taken by WB to remedy this problem have been reactive, the work carried out as a result of this reaction seems to have had very positive impacts.

This lack of stakeholder engagement has been a significant issue during the project, and appears to be the reason why the PRODEMINCA project was subject to the World Bank Investigation Panel review (initiated through representations to the World Bank by an environmental group. The project was cleared by the Inspection Panel at the end of a full inspection. However, more pro-active engagement with non-geoscience stakeholders during the project could have helped in avoiding the circumstances arising which led to the investigation

The formal (subsequently determined to be unfoundded) complaint that lead to the inspection panel review of the PRODEMINCA project highlights the need for projects and programmes involving minerals to be

very carefully and pro-actively mananged. Whilst there is always vocal opposition to any intervention in the minerals sector, principally due to misinformed and unrepresentative interantional campaigning NGOs, there are potentially very significnat developemnt benefits from minerals projects. To avoid becoming enmeshed in activist protests, projects must communicate effectively. Also, it is critically important that environmental and social aspects are considered at the project design stage, and conditionallities are enforced promptly (which did not appear to happen in this project).

There are a number of generic lessons from this project that should be considered in future geoscience projects. These lessons are well established learning, and apply to development projects in general. However, this project serves as a good case study of the importance of these general principles in ensuring projects contribute to achieving DFID's strategic objectives.

- Early and full consideration of environmental issues is needed in all mining and geoscience related projects to avoid adverse impacts and negative stakeholder views. ToRs must reflect environmental issues, and environmental conditionalities must be implemented early in projects
- Wide and proactive communication with stakeholders, including those who may hold a negative view to ensure an objective view of the project is maintained
- Proactive communication between all parties to the project is needed to ensure conditionalities and needs are being met, and to resolve issues early on
- Visible results are required to engender a positive view of the project with stakeholders
- Capacity building must be integral to projects with a technical focus to ensure that technology and skills transfer can be used appropriately
- Mechanisms for retaining staff trained by projects in the sector and public service must be considered at design stage and implemented from the beginning of the project to mvoe towards sustainability

Although the project received criticism on environmental issues, no adverse environmental impact from the project is apparent on project completion. Overall the PRODEMINCA project (of which the GIMP is a component) has had significant positive impacts and the GIMP component has achieved its purpose.

The sustainability question is one that needs examining. Whilst direct funding for the GSO does not appear to be a priority, during the final monitoring mission, mechanisms for extra-budgetary funding and using exploration revenue licence fees for funding the GSO as a type of QANGO, which would enable more competitive salaries to be paid to staff were discussed. An evaluation of the impact of this, in the event that these discussions move forward to reality, should be considered, as it may provide a useful model for sustainability where central funding is difficult to obtain.

The small-scale mining component appears to have been a particularly successful intervention in this difficult area. This component provide a valuable case study for successful techniques in the small-scale mining sector in a Latin American context.

(c) Other partners (NGOs/private sector):

Not applicable

10. Additional Information

On December 17, 1999, the World Bank Inspection Panel (IP) received a request for inspection from two NGO's established in the Intag valley, in the northern part of the Western Cordillera. The complaint was directed to the geological and thematic mapping component, carried out by DINAGE and the British Geological Survey over the whole Western Cordillera area of Ecuador, and which included the survey of the Cotacachi-Cayapas Ecological Reserve, located close to the valley (the survey of all protected areas of

this region were specifically included in the mapping program during appraisal). Among other claims related to compliance with WB safeguard policies, the most important issue of the request was related to the public release of the information and the negative impacts it would generate on the environment and the community, as an unavoidable consequence of such release.

WB Management agreed with the findings of the IP as stated in their final report of February 2001, namely that it was substantially in compliance with OPN 11.02 on Wildlands and OD 13.05 on Project Supervision. With respect to Environmental Assessment, Management accepted the position stated in the Panel report that a more expanded and robust EA concerning processing, geographical scope and baseline data and consultation (OD 4.00, Annex A and OD 4.01) should have been undertaken during preparation.

With regard to the release of information, it was found that the geological and thematic mapping carried out under the Project is ecologically neutral and thematic mapping is generally beneficial for the country, as it increases its database of knowledge on its natural resources. It will also help identify areas that are sensitive and that could be excluded from mining development. The information must be "carefully managed so as not to generate adverse social and environmental consequences.." (for measures taken by the GOE and the Bank in this regard, see section 4.2).

For details related to the IP investigation, please refer to the "Investigation Report on Ecuador Mining Development and Environmental Control Technical Assistance Project, Loan No. 3655-EC) (INSP/R2001-1, February 23, 2001); and to the "Management Report and Recommendation in Response to the Inspection Panel Investigation Report" (April 10, 2001).

Annex 1. Key Performance Indicators/Log Frame Matrix

Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR[1]	Actual/Latest Estimate
(i) Increased private investment in mining.	Not applicable	(i) Partially achieved. Investments increased until start of economic and metal prices recession (1997). Picking up in 2000.
(ii) More appropriate legal and regulatory framework		(ii) Achieved: Mining Law 126 and amendment enacted; General Mining Regulations and amendment, Environmental Regulations for Mining Activities and Health and Safety Regulations for Mining Activities approved.
(iii) Effective application and administration of legal/regulatory framework by public mining institutions		(iii) Achieved. DINAMI and UAM are operational
(iv) Enactment of environmental legal and regulatory framework in mining.		(iv) Enacted: see (ii). In addition: guidelines for relationships between mining projects and communities under development.
(v) Improved environmental permitting and control (incl. monitoring) by Government authorities.		(v) Achieved: staff of DINAMI and UAM, including regional offices, trained; management systems and procedures established and operational.

Output Indicators:

Indicator/Matrix	Projected in last PSR[1]	Actual/Latest Estimate
I. Institutional Strengthening	Not Applicable	
(a) Designing new functions for management of mining rights and environmental permits		Completed
(b) Passing necessary regulations/decrees to establish required framework		Completed
(c) Elimination of corporate functions of CODIGEM		Completed
(d) Rationalization of personnel		Completed
II. Technical Component		
(a) Conducting environmental baseline studies in mining areas of Southern Ecuador		Completed
(b) Building of dams to contain tailings		Completed
(c) Completing environmental management master plan		Completed
(d) Publication of geological and geochemical maps		Completed
(e) Developing sector GIS		Completed
(f) Developing a computerized Mining Cadastre Administration System		Completed

[1] End of project

Annex 2. Project Costs and Financing

Project Cost by Component (in US$ million equivalent)

Project Cost By Component	Appraisal Estimate US$ million	Actual/Latest Estimate US$ million	Percentage of Appraisal
1. Project Coordination	0.80	1.26	157.5
2.1 Policy Management: MEM/SSM	0.30	1.08	360
2.2 Policy Management: DINAMI	1.00	0.90	90
2.3 Policy Management: DINAPA/UAM	0.60	0.45	75
2.4 and 5 Policy Management: CODIGEM/DINAGE	0.70	0.43	61.4
3.1 Policy Implementation: Environmental Pollution and Health Monitoring	3.00	2.42	80.7
3.2 Policy Implementation: Hazardous Mining Wastes	2.10	1.05	50
3.3 Policy Implementation: Geological Mapping	4.10	3.57	87.1
3.4 Policy Implementation: Thematic Mapping	2.80	3.74	133.6
3.5 Policy Implementation: Assessment of Ore Districts	1.70	1.12	65.1
3.6 Policy Implementation: Mining Information Systems	1.70	1.36	80
3.7 Policy Implementation: New Mining Cadastre	0.90	1.38	153.3
3.8 Policy Implementation: Small-scale Mining	2.00	1.79	89.5
Total Baseline Cost	21.70	20.55	
Physical Contingencies	2.30		
Total Project Costs	24.00	20.55	
Total Financing Required	24.00	20.55	

Project Costs by Procurement Arrangements (Appraisal Estimate) (US$ million equivalent)

Expenditure Category	Procurement Method[1] ICB	NCB	Other[2]	N.B.F.	Total Cost
1. Works	2.50		1.30	0.20	4.00
	(2.50)	()	(1.00)	(0.00)	(3.50)
2. Goods	2.30	0.50	0.00	0.00	2.80
	(2.20)	(0.50)	(0.00)	(0.00)	(2.70)
3. Services	6.00	1.20	0.00	7.60	14.80
	(6.00)	(0.60)	(0.00)	(0.00)	(6.60)
4. Incr. Operating Costs	0.00	0.00	1.60	0.00	1.60
	(0.00)	(0.00)	(0.70)	(0.00)	(0.70)
5. Training and Education Material	0.00	0.00	0.50	0.30	0.80
	(0.00)	(0.00)	(0.50)	(0.00)	(0.50)
6.	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Total	10.80	1.70	3.40	8.10	24.00
	(10.70)	(1.10)	(2.20)	(0.00)	(14.00)

Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US$ million equivalent)

Expenditure Category	Procurement Method[1] ICB	NCB	Other	N.B.F.	Total Cost
1. Works	2.87	0.01	0.00	0.25	3.13
	(2.44)	(0.00)	(0.00)	(0.00)	(2.44)
2. Goods	2.02	0.10	0.00	0.10	2.22
	(2.02)	(0.09)	(0.00)	(0.00)	(2.11)
3. Services	4.70	0.60	0.15	6.30	11.75
	(4.70)	(0.54)	(0.13)	(0.00)	(5.37)
4. Incr. Operating Costs	0.00	0.00	0.69	2.10	2.79
	(0.00)	(0.00)	(0.49)	(0.00)	(0.49)
5. Training and Education Material	0.00	0.00	0.61	0.05	0.66
	(0.00)	(0.00)	(0.59)	(0.00)	(0.59)
6.	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Total	9.59	0.71	1.45	8.80	20.55
	(9.16)	(0.63)	(1.21)	(0.00)	(11.00)

[1/] Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

[2/] Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Project Financing by Sub-component (in US$ million equivalent)

Sub-component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Govt.	CoF.	Bank	Govt.	CoF.	Bank	Govt.	CoF.
1. Project Coordination	0.85	0.25		1.02	0.24		120.0	96.0	
2.1 MEM/SSM	0.30	0.05		1.02	0.06		340.0	120.0	
2.2 DINAMI	1.00	0.10		0.82	0.09		82.0	90.0	
2.3 DINAPA	0.40	0.05	0.20	0.33	0.02	0.10	82.5	40.0	50.0
2.4/5 CODIGEM	0.70	0.10		0.39	0.05		55.7	50.0	
3.1 Env. Monitoring	1.50	0.20	0.60	0.76	0.03	1.63	50.7	15.0	271.7
3.2 Hazardous Waste	1.40	0.20	0.70	0.69	0.01	0.35	49.3	5.0	50.0
3.3 Geological Mapping	1.75	0.25	2.50	0.74	0.04	2.79	42.3	16.0	111.6
3.4 Thematic Mapping	1.90	0.20	1.10	2.34	0.07	1.33	123.2	35.0	120.9
3.5 Ore Districts Assmt.	1.70	0.20		1.12	0.00		65.9	0.0	
3.6 M.I.S	1.20	0.10	0.60	0.48	0.03	0.85	40.0	30.0	141.7
3.7 Mining Cadastre	0.50	0.05	0.40	0.73	0.05	0.60	146.0	100.0	150.0
3.8 Small-scale Mining	1.00	0.15	1.00	0.56	0.06	1.16	56.0	40.0	116.0
Total	14.00	1.90	8.10	11.00	0.75	8.80	78.6	39.5	108.6

Annex 3. Economic Costs and Benefits

Not applicable

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
			Implementation	Development
Month/Year	Count	Specialty	Progress	Objective
Identification/Preparation				
02/28-03/0, 1989	*1*	Mining Specialist		
08/26-09/06, 1989	*2*	Mining Specialist, Mining Legal Specialist		
09/24-30, 1989	*1*	Mining Economist		
10/10-15, 1989	*1*	Mining Economist		
04/30-07/07, 1990	*2*	Mining Specialist, Mining Economist		
07/29-08/04, 1990	*1*	Mining Specialist		
11/26-12/03, 1990	*1*	Mining Specialist		
04/27-05/26, 1992	*2*	Operations Officer, Mining Specialist		
09/09-14, 1992	*1*	Operations Officer		
Appraisal/Negotiation				
11/30-12/17, 1992	*7*	WB: Operations Officer, Mining Economist, Environmental Specialist, Disbursement Specialist. ODA: Economist, Environmental Specialist. SIDA: Mining Specialist.		
05/25-26, 1993	*1*	Division Chief		
Supervision				
06/27-07/02, 1994	*1*	Operations Officer	S	S
11/15-17, 1994	*2*	Operations Officer, Economist	S	S
05/05-10, 1995	*1*	Mining Specialist	S	S
06/12-22, 1995	*2*	Economist, Mining Specialist	U	S
08/07-10, 1995	*1*	Economist	U	S
09/11-26, 1995	*2*	Economist, Mining Specialist	U	S
10/30-11/02, 1995	*1*	Mining Specialist	U	S
02/20-03/01, 1996	*4*	Economist, Mining Specialist, Energy Economist, Operations Officer	U	S
04/29-05/03, 1996	*1*	Mining Specialist	S	S
07/29-08/02, 1996	*2*	Energy Economist, Mining Specialist	S	S
09/23-26, 1996	*1*	Mining Specialist	S	S
10/18-26, 1996	*6*	WB: Energy Economist, Mining Specialist. ODA: Environmental and Mining Specialists; SIDA: Project Officer and Environmental Specialist.	S	S
03/31-04/05, 1997	*1*	Energy Economist	S	S

	05/09-16, 1997	*3*	Energy Economist, Mining Specialist, Legal Specialist	S	S
	06/16-20, 1997	*2*	Energy Economist, Mining Specialist	S	S
	10/03-10, 1997	*2*	Energy Economist, Mining Specialist	S	S
	11/10-14, 1997	*6*	Energy Economist, Mining Specialist; ODA: 2 Mining Specialist; SIDA: 2 Environmental Specialists.	S	S
	03/10-13, 1998	*2*	Energy Economist, Mining Specialist	S	S
	09/07-11, 1998	*1*	Energy Specialist	S	S
	11/16-23, 1998	*5*	WB: Energy Economist, Mining Specialist; DFID: Mining Specialist; SIDA: Environmental and Mining Specialists.	S	S
	04/16-20, 1999	*1*	Mining Specialist	S	S
	04/23-25, 1999	*1*	Mining Economist	S	S
	06/21-29, 1999	*1*	Mining Specialist	S	S
	10/14-17, 1999	*2*	Mining Specialist, Social Specialist	S	S
	10/29-11/14, 1999	*7*	WB: Mining Specialist, 2 Social Specialists; DFID: Mining Specialist; SIDA: 2 Project Officers and Environmental Specialist.	S	S
	06/06-17, 2000	*6*	Sector Manager, Mining Specialist, Environmental Specialist, 3 Social Specialists	S	S
ICR					
	08/29-09/06, 2000	*1*	Mining Specialist		
	10/29-11/02, 2000	*3*	Mining Specialist, 2 Social Specialists		
	11/19-12/01, 2000	*3*	WB: Mining Specialist, 2 Social Specialists; DFID: Environmental and Mining Specialists.		

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US$ ('000)
Identification/Preparation	48.7	243.7
Appraisal/Negotiation	20.9	104.4
Supervision	98.9	494.6
ICR	9.6	48
Total	178.2	890.7

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	Rating
☐ *Macro policies*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Sector Policies*	○ *H* ● *SU* ○ *M* ○ *N* ○ *NA*
☐ *Physical*	○ *H* ● *SU* ○ *M* ○ *N* ○ *NA*
☐ *Financial*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Institutional Development*	○ *H* ● *SU* ○ *M* ○ *N* ○ *NA*
☐ *Environmental*	○ *H* ● *SU* ○ *M* ○ *N* ○ *NA*
Social	
☐ *Poverty Reduction*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Gender*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Other (Please specify)*	○ *H* ○ *SU* ○ *M* ○ *N* ○ *NA*
☐ *Private sector development*	○ *H* ○ *SU* ● *M* ○ *N* ○ *NA*
☐ *Public sector management*	○ *H* ● *SU* ○ *M* ○ *N* ○ *NA*
☐ *Other (Please specify)*	○ *H* ○ *SU* ○ *M* ○ *N* ○ *NA*

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance	*Rating*
☐ *Lending*	○ *HS* ● *S* ○ *U* ○ *HU*
☐ *Supervision*	○ *HS* ● *S* ○ *U* ○ *HU*
☐ *Overall*	○ *HS* ● *S* ○ *U* ○ *HU*

6.2 Borrower performance	*Rating*
☐ *Preparation*	○ *HS* ● *S* ○ *U* ○ *HU*
☐ *Government implementation performance*	○ *HS* ● *S* ○ *U* ○ *HU*
☐ *Implementation agency performance*	○ *HS* ● *S* ○ *U* ○ *HU*
☐ *Overall*	○ *HS* ● *S* ○ *U* ○ *HU*

Annex 7. List of Supporting Documents

1. Memorandum of the President for the Ecuador Mining Development and Environmental Control TA Project, dated September 22, 1993 (Report No. P-5988-EC)
2. Environmental Assessment
3. Loan Agreement for the Ecuador Mining Development and Environmental Control TA Project, signed October 20, 1993 (Loan 3655-EC)
4. Aide Memoires, Back-to-Office Reports, and PSRs
5. Project Quarterly Progress Reports;
6. Project Annual Audit Reports;
7. Consultant Study Reports financed under the Project (ca. 200), including particularly (titles in italic have been published; most of the others are available as open files at SSM):
    1. Sector Legal and Institutional Reform (overall)
        - Reformas al Reglamento de la Ley de Mineria 126. SSM, June 1996
        - Fortalecimiento de las Instituciones Públicas del Sector Minero. Luis Bilbao, December 1996.
        - *Estadistica Minera 1991-1996. Gregorio Roman, DINAMI, June 1998.*
        - Diagnóstico Institucional del Sector Minero de Ecuador y Recomendaciones para el Contenido Institucional de la Nueva Ley de Minería. I2C, December 1998.
        - Manual de Procedimientos y Catálogo de Funciones para la Subsecretaría de Minas con Base en el Nuevo Modelo Institucional. Versión Final de la Fase Conceptual. Maritza Rojas and Yurina Zalumbide, October 1999.
        - Implementación del Nuevo Modelo Institucional. Direcciones Regionales y Unidad de Soporte al Sistema de Información Minera (USSIM). I2C, November 1999.
        - Evaluación y Reforzamiento del Sector Minero. I2C, May 2000.
        - Reformas a la Ley de Mineria 126 (Ley para la Promocion de la Inversion y Participacion Ciudadana). GOE, August 2000.
        - *Ley de Mineria y Reglamentos. Version en ingles y espanol. SSM, July 2001.*
    2. Sector Legal and Institutional Reform - Environmental Management
        - Resumen de las Disposiciones Legales e Institucionales Relacionadas a la Minería y el Medio Ambiente. Faith Halter (SES), August 1995.
        - Reglamento de Salud y Seguridad Minera. SSM, ..
        - *Reglamento Ambiental para las Actividades Mineras. SSM, September 1997.*
        - Evaluación de la capacidad analítica de laboratorios nacionales. Consuelo Hernandez, Dinapa, March 1998.
        - Propuesta de Desarrollo Institucional de la Dirección Ambiental Minera. Dirección Nacional de Protección Ambiental. Mark Kenber, Fundacion Natura, May 1998.
    3. Environmental Management and Monitoring
        - Exposure to mercury, lead and cadmium in miners in Ponce Enríquez, Portovelo/Zaruma and Nambija in Ecuador. A preliminary report. Staffan Skerfving, SES, April 1995.
        - Caracterización de las zonas de Pijilí, Ponce Enríquez, Santa Rosa y Portovelo. Anibal Vaca et al., INAHMI, July 1996.
        - Diagnósticos Ambientales de las ciudades de Portovelo y Zaruma. Santiago Espinoza, August 1996.
        - Viabilidad del Confinamiento, Neutralización y/o Destoxificación de los Desechos Mineros, Distrito Minero Bella Rica, Provincia de Azuay, Ecuador. Tom Lundgren, SES, October 1996.
        - Indicadores Biológicos de Contaminación de la Minería del Oro en Ecuador. Olof Sangsfors and Lennart Lindeström, SES/DINAPA, February 1997.
        - Memoria Técnica de los trabajos ejecutados por Fundación CENDA en la Región de Ponce

Enríquez y Pijilí. Fundacion CENDA, April 1997.

- Estudio de prefactibilidad referente al confinamiento de los desechos mineros en el Distrito de Ponce Enríquez. Bo Lundberg and Reidar Hoffner, SES, June 1997.
- Estudio de Factibilidad y Diseño de las Obras para el Confinamiento de los Desechos de Minería. Informe de Fase I. Leoncio Galarza et al. September 1998.
- *La Mineria y La Comunidad. Resultados y conclusiones de la conferencia de mayo 1997 en Quito. Gary MacMahon (editor), PRODEMINCA/BM, December 1998.*
- Homogeneización de la Influencia de "El Niño" sobre las Precipitaciones de las Cuencas Hidrográficas del Sector Minero comprendido entre Ponce Enríquez y Portovelo. Edison Heredia et al., INAHMI, December 1998.
- Plan Conceptual de Manejo de Desechos Mineros. Ricky Collins, SES, February 1999.
- *Monitoreo Ambiental de las Areas Mineras en el Sur de Ecuador. 1996-1998. SES/UAM, April 1999.*
- *Oro Limpio. Resumen y conclusiones del monitoreo ambiental en la zona Sur del Ecuador (formato popular). PRODEMINCA/SES, April 1999.*
- Resultados de los Muestreos Bioacuáticos Complementarios en las Areas Mineras del Sur del Ecuador. Olof Sangfords and Adriana Flachier, SES, May 1999.
- Evaluación Técnica realizada en Areas Agrícolas de Ponce Enríquez Afectadas por las Actividades Mineras. Milton Carrasco and Adriana Flachier, June 1999.
- Diseño de Obras Hidráulicas. Luis Cornejo et al. June 1999.
- Trabajo en la Minería del Oro, Exposición a Polvo Silíceo, Ruido y Metales Pesados y Salud Ocupacional en Cuatro Areas del Ecuador. Raul Harari et al., June 1999.
- Esquema de Gestión Ambiental Participativa para la Ejecución y Mantenimiento de las Obras de Mitigación Ambiental en las Sociedades Mineras de Bella Rica y San Gerardo. Cecilia Mantilla et al., September 1999.
- Esquema de Manejo de Aguas (EMA). Luis Cornejo, September 1999.
- Manual de Operación y Manejo del Agua en las Instalaciones Mineras. Luis Cornejo, October 1999.
- Plan de Obras a ejecutarse como Segunda Etapa del PMA. Luis Cornejo, October 1999.
- Exposure to and Toxic Effects of Mercury in the Ecuador ian Gold Mining Industry. Lars Gerhardsson et al, Lund University, October 1999
- Sistematización del Plan de Capacitación para los Comités de Gestión Ambiental de Shumiral y Ponce Enríquez. Taller de Gestión Ambiental y Género. Cecilia Mantilla et al., March 2000.
- *Medidas Ambientales Emergentes y el Establecimiento de un Plan Maestro Ambiental en el Distrito Minero Portovelo-Zaruma y la Cuenca del Río Puyango. Plan Maestro Ambiental. Swedish Geological AB, April 2000.*
- El Proceso de Configuración de la Gestión Ambiental Participativa en las Zonas Mineras de Ponce Enríquez y Shumiral. Cecilia Mantilla et al. June 2000.
- Curso de prevención de las enfermedades ocupacionales en la minería aurífera. Fernando Carpio, August 2000.
- *La Salud de Nuestros Rios - Manual y Metodo Simple de Evaluacion de la Calidad de los Rios. Adriana Flaschier, Ocotber 2000.*

4. Geological Information Infrastructure
   - Geology of the Cordillera Occidental of Ecuador between 1° 00' and 2° 00' S. McCourt, Duque and Pilatasig, CODIGEM/BGS, June 1997
   - Geology of the Cordillera Occidental of Ecuador between 2° 00' and 3° 00' S. Peter Dunkley and Alina Gaibor, CODIGEM/BGS, June 1997
   - Geology of the Cordillera Occidental of Ecuador between 3° 00' and 4° 00' S.Warren T. Pratt, Juan Figueroa and Bolivar Flores, June 1997.

- Geology of the Cordillera Occidental of Ecuador between 0° 00' and 1° 00' S. R.Hughes and R. Bermúdez, CODIGEM/BGS, June 1997.
- Geochemical Reconnaissance Survey of the Cordillera Occidental of Ecuador between 2° 00' and 3 00' South. T M Williams, A. Gaibor and P.N. Dunkley, CODIGEM/BGS, November 1997.
- Geochemical Reconnaissance Survey of the Cordillera Occidental of Ecuador between 3° 00' and 4 00' South. Williams, Gaibor and Dunkley. CODIGEM/BGS, June 1998.
- Geochemical Reconnaissance Survey of the Cordillera Occidental of Ecuador between 1° 00' and 2 00' South. T M Williams, W. Castillo, E. Cruz and V. Acitimbay, CODIGEM/BGS, June 1999.
- Descripción Bioecológica y Socioeconómica de los Distritos Mineros Estudiados por el Subcomponente 3.5 de PRODEMINCA. Ruth Elena Ruiz et al., Fundacion Natura, April 2000.
- Posiciones en torno a la difusión de la Información Geoquímica generada por PRODEMINCA. Informe Final.CEPLAES, April 2000.
- Levantamiento Geofísico Aéreo. Cordillera Occidental de los Andes Ecuatorianos. Informe Final (versiones en inglés y español). SIAL Geophysics, May 2000.
- Geoscience in Integrated Resource Management. Volume 1: The Western Cordillera, Volume 2: Molleturo Protected Forest y Volume 3: Ecological Resreve Cotacachi-Cayapas. PRODEMINCA/BGS, May 2000.
- Geology of the Cordillera Occidental of Ecuador between 0°00´and 1°00´ N. Martin Boland et al., DINAGE/BGS, June 2000.
- *Evaluación de Distritos Mineros del Ecuador. Volumen 1: Potencial Minero Metálico y Guías de Exploración; Volumen 2: Depósitos Epitermales en la Cordillera Andina; Volumen 3: Sulfuros Masivos Alojados en Volcanitas. Volumen 4. Depósitos Porfídicos y Epi-Mesotermales Relacionados con Intrusiones de las Cordilleras Occidental y Real. Volumen 5: Depósitos Porfídicos y Epi-Mesotermales Relacionados con Intrusiones de la Cordillera el Condor. Peter Pittfield et al., BGS. June 2000.*
- *Manual de Exploracion de Depositos metaliferos en el Ecuador. peter Pittfield, BGS, June 2000.*
- Manual Técnico Sistema GIMP (incluye CD con datos de GIS para aplicación). Edgar Cruz, DINAGE/BGS, June 2000.
- *Percepciones sobre la Información Geoquímica Generada por PRODEMINCA en la Zona de Intag. CEPLAES, August 2000.*
- *Breve Lexico Estratigrafico del Ecuador. Pablo Duque, October 2000.*
- Geochemical Reconnaissance Survey of the Cordillera Occidental of Ecuador between 0°00´and 1°00´ N. T.M. Williams et al., DINAGE/BGS, May 2001.
- *Geoquimica y Ambiente. T.M. Williams et al., Prodeminca, May 2001.*
- *Mineria: realidades y perspectivas. PRODEMINCA, July 2001.*

5. Management and Information Systems
   - Proyecto de Catastro Minero en Ecuador. Enrique Ortega, November 1995.
   - Documento de Planeamiento del Catastro Minero. F. Sarria, January 1996.
   - An Information Systems Strategy Scoping Study for Component Three of the Project to Develop Mining And Control the Environment. Jeremy R.A. Giles, BGS, July 1996.
   - *Catálogo de Información Técnica. Martha Correa et al., CODIGEM/SES, May 1997.*
   - Sistema de Administración de los Derechos Mineros. Manual de Administración del Sistema. Luis Oña, Marco Cazco, Juan Chamorro and Klas Lundquist, DINAMI/SES, December 1997.
   - SIGM - Informe Final. Krister Lindquist, SES, June 1999.
   - Manual de Administración y Técnico del Sistema de Administración de Estudios Ambientales

Mineros. Washington Romero, UAM/SSM, November 1999.

- Manual de Usuario del Sistema de Administración de Estudios Ambientales Mineros. Washington Romero, UAM/SSM, November 1999.
- Formularios de Evaluacion de Impactos Ambientales Mineros y de Denuncias Ambientales Mineras. Washington Romero, UAM/SSM, November 1999.
- Sistema de Registro y Notificación de Enfermedades Mineras. Manual Técnico y de Administración y Manual del Usuario. Juan Chamorro, SSM, November 1999.
- GeoCampo. Base de Datos para Geología de Campo. P. Duque, February 2000.
- SIP. Sistema de Información de Proyectos (Estándares y Control de Calidad). P. Duque, February 2000.
- Manual de Normas y Diccionarios para Mapeo Digital (versión 2). P. Duque et al., February 2000.
- Manual de Administración. Sistema de Administración Minera, SIM. Washington Rosero, May 2000.
- Manuales del Sistema de Información Geográfica – Geológica – Minera. Manuales del SIGEM. Tecservin Cia Ltda., May 2000.
- Manual de Usuario. Interface SIP-SIGEM. Washington Rosero, June 2000.
- Sistema de Administración de los Derechos Mineros (SADMIN). Manual de Administración del Sistema y Manual de usuario. Luis Oña and Juan Chamorro, DINAMI, June2000.

6. Artisanal and Small-scale Mining
   - Preliminary proposal for a conceivable J/V agreement for a mining project in Ecuador. A. Swartling, CODIGEM/SES, January 1995.
   - Registro de plantas gravimétricas y de cianuración en el área de Ponce Enríquez. B. Fagerberg, CODIGEM/SES, June 1995.
   - Aspectos Sociológicos en la Minería. A. Rundqvist, SES, June 1995.
   - Factibilidad de instalación de un "Centro de Beneficio Mineral" en el área de Ponce Enríquez. (Informe de Evaluación). B. Fagerberg, SES, June 1995.
   - Investigación. Relación entre Pueblos Indígenas y Minería Aurífera. Informe Final. Miguel Carvajal, Natalia Wray and Rafael Mashinguiash, January 1996.
   - Investigaciones de laboratorio en muestras de mineral del área de Ponce Enríquez y evaluación de métodos para la eliminación del proceso de amalgamación. B. Fagerberg, SES, February 1996.
   - Catastro de sociedades mineras del Distrito Aurífero de Zaruma y Portovelo según coordenadas de localización territorial. N. Romero, May 1996.
   - Informe Final del Estudio Diagnóstico Socioeconómico de Nambija. L. Pereira V. and Jaime Espín D., May 1996.
   - Censo Minero de Zaruma y Portovelo. Memoria Técnica. Universidad Central del Ecuador, May 1996.
   - Estudio Socioeconómico del Centro Minero Ponce Enríquez. Miguel Carvajal and José Rivadeneira, May 1996.
   - Programa de capacitación empresarial. Sector minero de San Gerardo. Provincia del Azuay. Organización y administración empresarial. F. Chango, October 1996.
   - Diagnóstico de la Minería Artesanal de Oro en el Ecuador. Reidar Hoffner, Jorge Barragán, Solange Izurieta and Alcides Sánchez, October 1996.
   - Investigaciones de Beneficio de Menas Auríferas de Ponce Enríquez para la eliminación del proceso de amalgamación y mejoramiento en la recuperación de oro. Bengt Fagerberg and José Valencia, SES, April 1997.
   - *Relación entre pueblos indígenas y minería aurífera. Miguel Carvajal et al., May 1997.*
   - *Perspectiva socioeconómica de la Pequeña Minería y la Minería Artesanal (estudio de caso*

de Nambija y Ponce Enríquez). Anders Rudqvist and Miguel Carvajal, May 1997.
- o Inspección técnica y asesoría para la formulación de recomendaciones preventivas ante el fenómeno de El Niño en áreas mineras. L. Galarza et al., November 1997.
- o Documento de Apoyo para el Seminario-Taller sobre formulación de Proyectos Sociales, realizado entre el 8 y el 12 de diciembre de 1997. J.C. Cuellar, December 1997.
- o *Censo Minero de Zaruma y Portovelo. SSM/PRODEMINCA, May 1998.*
- o Estudio de canteras (6 volúmenes correspondientes a las provincias de Azuay, Cañar, Chimborazo, Tungurahua, Bolívar y Loja). CODIGEM, July 1998.
- o Investigaciones de beneficio de menas auríferas de Los Ingleses y Muluncay. B. Fagerberg and J. Valencia, SES, July 1998.
- o Curso de Seguridad Minera. W. Bonilla, August 1998.
- o Estudio Ambiental de las zonas de canteras (Diagnóstico Ambiental de explotación de canteras de materiales de construcción en la provincia del Guayas. Informe Ejecutivo). CODIGEM, October 1998.
- o Procesamiento de Menas Auríferas en el Sur del Ecuador. B. Fagerberg and J. Valencia, SES, November 1998.
- o Informe Final. Trabajo de Asistencia Técnica a la Sociedad Jesús del Gran Poder. Escuela Politecnica Nacional, June 1999.
- o Deslizamiento Area Minera "Fortuna". DINAGE, December 1999.
- o Estudio del Deslizamiento en la Parroquia San Francisco del Vergel, Cantón Palanda, Provincia de Zamora Chinchipe. DINAGE, December 1999.
- o *Procesamiento de Menas Auriferas en el Sur del Ecuador - La Cianuracion Industrial, una Alternativa a la Amalgamacion. Ximena Diaz, Ernesto de la Torre, Pedro Mantilla y Antonio Bermeo, PRODEMINCA, November 2000.*

8. Management Response to Request for Inspection Panel Review of Ecuador Mining Development and Environmental Control Technical Assistance Project (Loan 3655-EC). WB Management, January 2000.
9. Request for Inspection: Ecuador Mining Development and Environmental Control Technical Assistance Project (Loan 3655-EC). Inspection Panel, May 2000.
10. Investigation Report on Ecuador Mining Development and Environmental Control Technical Assistance Project (Loan 3655-EC). Report INSP/R2001-1), February 2001.
11. Management Report and Recommendation in Response to the Inspection Panel Investigation Report. WB Management, April 2001.
12. Borrower's Evaluation Report. MEM/SSM, July 2001.

Additional Annex 8. Borrower's Evaluation Report

PROYECTO DE ASISTENCIA TÉCNICA PARA EL DESARROLLO MINERO Y SU CONTROL AMBIENTAL EN ECUADOR (PRÉSTAMO BIRF 3655-EC)

Comentarios del Prestatario

1. Objetivos del Proyecto

1.1 Objetivos generales del proyecto

El propósito del Proyecto de Asistencia Técnica para el Desarrollo Minero y su Control Ambiental, PRODEMINCA, fue:

a) atraer nueva inversión privada y apoyar un desarrollo sistemático para incrementar la producción minera en el Ecuador cuidando el medio ambiente y las relaciones con las comunidades circundantes a prospectos mineros; y,

b) detener y mitigar la degradación del medioambiente que resulta del uso de tecnología inadecuada por parte de los mineros artesanales algunas operaciones mineras de pequeña escala en el Ecuador

1.2 Objetivos específicos del proyecto

Para lograr nuevas inversiones privadas en la minería ecuatoriana y apoyar la producción de minerales en condiciones amigables con la naturaleza y social y ambientalmente sostenibles se planteó:

· Un mejoramiento del marco legal e institucional, modernizando y fortaleciendo las entidades del sector público minero, a fin de mejorar e incrementar su capacidad de manejo del catastro minero, seguimiento y monitoreo de las operaciones en sus aspectos técnicos, fiscales y ambientales.

· Desarrollo de varios objetivos técnicos, para establecer o incrementar la capacidad de monitoreo y mitigación de daños ambientales por acción de cierta minería de pequeña escala; para fortalecer la capacidad de obtención, manejo y difusión de información cartográfica y geológica; para disponer de un catastro minero y sistemas de información computarizados, y, para dar asistencia integral a los mineros de pequeña escala

1.3. Cumplimiento de los objetivos de PRODEMINCA

Un enfoque integral y multidisciplinario

Si bien los objetivos del proyecto se han mantenido desde su inicio, el enfoque a cada uno de los aspectos evolucionó durante la implementación, privilegiando intervenciones, metodologías y procesos multidisciplinarios que integraron aspectos ambientales y sociales y permitieron una mayor participación de la sociedad civil y ong's.

En una primera etapa, esto se reflejó en la preparación de diagnósticos socioeconómicos y ambientales en varios subcomponentes, y posteriormente en el énfasis para impulsar soluciones integrales y participativas en temas como salud ocupacional minera, remediación ambiental y difusión de resultados.

Una descripción detallada de los principales logros del proyecto consta en varias publicaciones realizadas. En las siguientes líneas los comentaremos solamente en forma breve:

Modernización del marco legal del sector. Al término del proyecto, el gobierno del Ecuador (en adelante el gobierno o el MEM), considera que cuenta con un marco legal adecuado y competitivo respecto a otros países que buscan recibir inversión minera en América Latina. Se logró mejorar el marco legal del sector,

generando mayor seguridad jurídica a la inversión, mayores cuidados ambientales y comunitarios por parte de los concesionarios mineros, y la eliminación de áreas para uso exclusivo del Estado. Se redactaron y aprobaron:

a. Reformas a la Ley de Minería, que entraron en vigencia entre agosto y diciembre de 2000, acogiendo planteamientos como el título único, que da seguridad a la concesión; la patente progresiva, que disminuirá la especulación improductiva de áreas, la eliminación de las regalías, que permite mayor competitividad y evita riesgos de corrupción, y la supresión de la inversión corporativa por parte del estado, dejando la inversión de riesgo al sector privado. Estos fueron los principales postulados del proyecto.

b. El nuevo Reglamento a la Ley de Minería se dictó en abril de 2001. Reformas al Reglamento de la Ley de Minería, se emitieron en dos ocasiones anteriores, estableciendo finalmente un adecuado complemento a las nuevas disposiciones legales y agregando transparencia al proceso de otorgamiento de áreas mineras

c. Reglamento de Salud y Seguridad Minera; y,

d. Reglamento Ambiental para la Actividad Minera, cuya formulación concertada fue la primera experiencia participativa en propuestas legales en el Ecuador.

Durante el proyecto se prepararon varias versiones de una nueva Ley de Minería, cuyos textos fueron debatidos largamente con el parlamento y con actores sociales claves, sin lograr su aprobación. Sin embargo, las principales propuestas han sido recogidas en las reformas vigentes desde diciembre de 2000. Con ello, puede considerarse que este objetivo ha sido cumplido muy satisfactoriamente y –salvo ligeras modificaciones al reglamento ambiental- no se requerirán reformas legales en un futuro cercano.

Instituciones Públicas Mineras. Se logró la transformación y fortalecimiento de las instituciones públicas mineras, acorde a principios modernos sobre el rol del estado como regulador y responsable del monitoreo de la actividad minera. El sector estatal solamente realizará la investigación geocientífica regional, a través de la recientemente creada Dirección Nacional de Geología (DINAGE), que sustituyó a la Corporación de Desarrollo e Investigación Geológico Minero Metalúrgica (CODIGEM); también se logró la reestructuración y fortalecimiento de la Dirección Nacional de Minería (DINAMI) y sus oficinas regionales; así como la creación de la Unidad Ambiental Minera (UAM). Los funcionarios recibieron capacitación y preparación para sus nuevas funciones dentro de este nuevo marco institucional.

Gestión Ambiental Minera. La gestión ambiental deberá ser multidisciplinaria, incluyendo aspectos como condiciones ocupacionales y sociales, descentralizada y ejecutada con participación de los gobiernos y comunidades locales, bajo la política y directrices del MEM. Para ello, se ha preparado a la Unidad Ambiental Minera, responsable de la evaluación y seguimiento de los Informes de Impacto Ambiental, y se han logrado los siguientes resultados:

a. desarrollo y puesta en operación de una red de monitoreo ambiental en el sur del país, y amplia difusión pública de sus resultados;

b. puesta en funcionamiento de un centro de salud ocupacional minera, en el distrito minero de Ponce Enríquez

c. construcción de obras demostrativas de contención y remediación de la contaminación en el distrito minero de Ponce Enríquez;

d. apoyo al establecimiento de comités de gestión ambiental en el municipio de Pucará (distrito minero de Ponce Enríquez);

e. preparación de un plan maestro de gestión ambiental de la cuenca del río Puyango afectada por el

distrito minero de Zaruma-Portovelo.

Minería de pequeña escala. Durante el desarrollo del proyecto, y luego de un amplio debate y de diversas experiencias a lo largo de seis años con las organizaciones de pequeños mineros, se ha demostrado que solamente un enfoque integrado, que incluya aspectos organizativos, legales, técnicos, sociales y ambientales, y procure incrementar la confianza de este sector con los organismos estatales, permite ordenar y modernizar de manera sostenible la minería de pequeña escala. Los resultados positivos logrados durante el desarrollo del proyecto representan experiencias y lecciones valiosas que podrán ser utilizadas tanto en el Ecuador como en otros países para mejorar las condiciones de este sector de la minería, para superar la informalidad, mejorar su rendimiento, reducir sus impactos ambientales y sociales negativos, e incorporarla al sector de pequeña industria. Durante el proyecto, se ha logrado:

a. la legalización de la mayoría de asentamientos mineros de hecho, que existían en 1995 en minería aurífera (de 169, hoy solo quedan 3);

b. apoyar la creación de asociaciones de pequeños mineros;

c. iniciar procesos de remediación ambiental;

d. introducir tecnologías alternativas al uso de mercurio; y,

e. mejorar la relación con las comunidades locales.

Información Geocientífica. Entre las actividades previstas en el proyecto, se incluía la recolección de información, producción y distribución de mapas geológicos y bases de datos geoquímicos de un área de 36.000 km2 en la Cordillera Occidental de Los Andes. Este trabajo se realizó con apoyo del Servicio Geológico Británico (BGS), y técnicos ecuatorianos, tanto de DINAGE como independientes. El trabajo supuso esfuerzos logísticos y técnicos superiores a lo programado, sin embargo de lo cual se concluyó en el tiempo previsto, y con una calidad superior, ya que los mapas fueron publicados en escala 1:200.000 (inicialmente se previó hacerlo en 1:250.000), y se dispone de información digitalizada sobre geología, geoquímica (con un muestreo de sedimentos con densidad de 1 m/2.44 km2, mientras inicialmente se esperaba 1/5 km2) y geofísica, así como bases de datos multisectoriales que contribuirán a la planificación de uso de territorios en esta cordillera. La difusión de esta información, que incluye zonas del patrimonio nacional de áreas naturales, se complementa con un sistema de monitoreo de la información que realizarán los Ministerios de Ambiente y de Energía y Minas, con la colaboración de dos de las mas prestigiosas ong's ambientalistas: Fundación Natura y CEDA, así como con una publicación sobre Geoquímica y Ambiente, que resume los usos multidisciplinarios, principalmente relacionados a gestión de uso territorial y de aguas, prevenciones ambientales, salud, infraestructura de caminos y obras civiles, riesgos naturales, de la información temática.

Se produjeron también estudios de alta calidad sobre varios tipos de depósitos minerales existentes en el país, en los que se sistematizan los principales modelos de yacimientos reconocidos. Este trabajo se resume en un Manual de Exploración, que incluye las principales condiciones legales, institucionales, técnicas y ambientales (esto último con la cooperación de Fundación Natura) necesarias para realizar exploración en el país.

Sistema de Información Minera. Al término del proyecto, debemos señalar que el sector geológico minero público cuenta con una red de computación que enlaza los sistemas ambientales, geológicos y de administración minera desarrollados en DINAMI y DINAGE, permitiendo la consulta tanto a funcionarios e interesados, tanto del sector minero como ambiental o de otras entidades, mediante una red intranet y el acceso de usuarios externos a través de internet. Nuestro parque informático es uno de los mejores del sector público ecuatoriano, y es usado intensamente por funcionarios debidamente capacitados. La página web - *mineriaecuador.com* - incrementa el número de visitas y nos permite promocionar el sector especialmente

en otros países.

Gestión de las concesiones mineras. Para garantizar la inversión minera y un adecuado monitoreo y control del sector es imprescindible el funcionamiento transparente y eficiente de un Catastro Minero computarizado. En el marco del Proyecto se estableció el Sistema de Administración de Derechos Mineros (SADMIN), para automatizar los trámites de otorgamiento, conservación y extinción de derechos mineros, aplicando las normas legales, la información de ubicación geográfica de las concesiones y sus restricciones en áreas protegidas. El SADMIN permite un control riguroso del proceso, reduciendo así la discrecionalidad e incrementando con ello la seguridad de los títulos. El sistema es accesible por internet (www. *mineriaecuador.com*).

1.4. Modificación de objetivos durante el transcurso del proyecto y fundamento de estos cambios

La formulación inicial del proyecto tuvo suficiente claridad de objetivos, respecto al propósito general del proyecto, y esto se mantuvo durante la ejecución. Sin embargo, algunos mecanismos fueron modificados durante el proyecto, siempre en el contexto del objetivo general.

Inicialmente, el proyecto suponía fortalecer la Dirección Nacional de Medio Ambiente, DINAMA y la Corporación de Desarrollo e Investigación Geológico Minero Metalúrgica, CODIGEM, las que, por efecto del proyecto, han sido transformadas a Unidad Ambiental Minera, UAM, bajo la Dirección Nacional de Minería, DINAMI y Dirección Nacional de Geología, DINAGE, desde marzo de 1999. Esta variación en la reforma institucional propuesta significó un mejor cumplimiento de los objetivos del proyecto, aunque también mayores estudios y esfuerzos para lograrlo.

Los componentes relativos a aspectos ambientales, suponían inicialmente un rápido monitoreo ambiental con aporte de entidades nacionales con capacidad de medición y análisis, lo que a la postre no fue posible obtener. Los estudios sobre salud humana y su afectación por actividades mineras de pequeña escala requirieron mas tiempo del previsto, ya que cubrieron problemas derivados de la pobreza y condiciones socioculturales imperantes en los distritos de pequeña minería, lo que amplió los objetivos planteados inicialmente y así como sus resultados, hasta poner en funcionamiento una unidad de salud, en coordinación con otro proyecto del Banco Mundial en la zona (Proyecto Fasbase, del Ministerio de Salud), y con aportes de la comunidad local.

Al inicio, no estuvo suficientemente valorada la necesidad de establecer una relación de confianza con los pequeños mineros, la que debió ser construida durante los primeros años del proyecto, para lograr condiciones de aceptación de las propuestas técnicas y ambientales generadas por los consultores. Sin embargo, el clima de confianza logrado significó el éxito de este proceso, no solo permitió cumplir los objetivos trazados, sino incrementarlos con lecciones que podrán ser aplicadas en otros países, y con nuevas propuestas para el sector.

Los aspectos de protección ambiental fueron ligeramente modificados, ampliando la gestión y participación local de las comunidades que rodean las explotaciones mineras auríferas, estableciendo un centro de diagnóstico y prevención de enfermedades ocupacionales relacionadas con minería en la zona de Ponce Enríquez, y construyendo una de las obras de remediación diseñadas durante el proyecto, como caso demostrativo.

2. Temas relevantes en la evolución de PRODEMINCA

Procesos de información y consulta

Este proyecto ha sido pionero en impulsar procesos de consulta (reconocidos en la Constitución de Ecuador desde 1998), a partir de 1996, en que utilizó este procedimiento para preparar el reglamento ambiental para actividades mineras. También permitió cambiar los criterios de difusión de información sobre contaminación (considerada "confidencial" antes del proyecto), y los de descentralización y desarrollo de capacidades de gestión a nivel de comunidades y gobiernos locales. Todo esto ha permitido racionalizar el debate entre conservación de biota versus desarrollo minero, que ha marcado la evolución del Proyecto en su última etapa.

Uno de los aportes importantes ha sido la publicación y amplia difusión de resultados del proyecto, los que, presentando de manera objetiva el balance entre ventajas y desventajas de la actividad minera, y sus relaciones con aspectos ambientales, han contribuido a orientar un permanente debate sobre explotación de recursos naturales en un país megadiverso.

Esto ha sido posible porque anteriormente se cumplieron algunas fases previas:

a) Difusión de información. La publicación de los diagnósticos iniciales, incluyendo la relación de la minería con pueblos indios, al inicio del proyecto, así como de los resultados del monitoreo ambiental, de las reformas legales promovidas bajo el proyecto y de las perspectivas de nuevos yacimientos, han superado un vacío existente en el país, incrementando la confianza e información indispensables para procesos de consulta. Las publicaciones consideraron diversas audiencias, unas con énfasis técnico y otras con interés comunitario o ambiental.

b) Impacto de la difusión de información. En Ecuador no existe tradición de difusión masiva de resultados sobre manejo de recursos naturales, por lo que hemos tenido diversas reacciones: amplia aceptación en universidades y en las principales ong's, por el valor que implica para el desarrollo de investigación y tesis de grado, y para planificación y desarrollo; clima de confianza en los distritos mineros, ya que al conocer los resultados de su situación de salud y de la contaminación causada en su entorno, logramos condiciones para establecer comités locales de gestión ambiental que superan los niveles de denuncia y realizan actividades de remediación con aportes importantes de cada comunidad. La difusión de los datos geoquímicos también ha generado expectativas en algunas organizaciones del norte de Ecuador, por su supuesta influencia en la presencia de mineros en áreas protegidas. Ante ello, se realizó un estudio sobre las percepciones que la población del valle de Intag (zona relativamente aislada al Occidente de Cotacachi), cuyos resultados fueron devueltos en una publicación a la comunidad, y se encargó a dos ong's representantes de la sociedad civil, el monitoreo del uso de la información generada por Prodeminca en áreas naturales protegidas, por un período de dos años a partir de enero de 2001. También se incrementaron las publicaciones sobre uso de las geociencias y su relación con eventuales yacimientos mineros.

c) Minería de pequeña escala. La información y consultas a actores sociales claves - grupos de comunidades afectadas, trabajadores, dueños de los negocios informales y autoridades locales - permitió establecer procedimientos para monitorear y remediar impactos en la salud y el ambiente. Publicar sus resultados dio seriedad y aseguró la toma de conciencia, definición de competencias y apoyo a las acciones de remediación. Las iniciativas de mejor relación con la comunidad, de incorporación de mejor tecnología apropiada, y de apertura a criterios de calidad ambiental, han sido posibles gracias a un amplio trabajo social que ha permitido transferir conceptos técnicos y fortalecer la actuación de gobiernos locales en el control ambiental.

d) Consultas para reformas legales. Todas las reformas legales y reglamentarias estudiadas en el sector, durante la vigencia del proyecto, se han discutido ampliamente convocando a los principales actores sociales.

En el proceso, debe destacarse el Reglamento Ambiental para actividad minera, en cuya discusión, con ong's ambientalistas, comunidades y entidades mineras, se ratificó el consenso de no realizar actividades mineras en áreas protegidas, hoy incorporado en el nuevo Reglamento.

e) Consulta Previa a la actividad minera. Bajo el proyecto se realizó una primera etapa de información del marco legal que regularía los procesos de consulta previa a actividades mineras. Al finalizar Prodeminca, el MEM, con apoyo del Banco Mundial, desarrolla una Guía de Relaciones Comunitarias, para proporcionar lineamientos, concertados entre los actores sociales claves (empresarios mineros, pequeños mineros, comunidades, ong's ambientales y de desarrollo, gobiernos locales y nacional) que permitan que la actividad minera se realice en armonía con las comunidades.

Desarrollo de capacidades locales e institucionales.

Se han enfatizado esfuerzos para construir capacidades locales para la gestión sostenible de la minería de pequeña escala, logrando la participación de las comunidades locales y sus gobiernos seccionales. Al inicio de 1999 el Proyecto colaboró en la conformación de dos Comités de Gestión Ambiental en Ponce Enríquez y San Gerardo, con la participación de miembros de cada comunidad como profesores, habitantes locales, centros de salud y lideres formales e informales. La formalización y adecuado registro de organizaciones mineras, reconocidas por el MEM, facilita su participación en mejoras técnicas, sociales y ambientales en su ámbito de influencia. Los municipios de Pucará (Ponce Enriquez), Portovelo y Santa Rosa, destacan a la fecha por su interés en gestión ambiental relacionada con minería de pequeña escala.

3. Principales observaciones y lecciones

Protección Ambiental y desarrollo minero sostenible.

Durante estos seis años, el proyecto ha incrementado el debate sobre protección ambiental, desarrollo minero, y condiciones de sostenibilidad en explotación de recursos no renovables, a propósito de la amplia difusión de sus resultados. El criterio de las principales ong's señala que la minería es parte importante del proceso de desarrollo del Ecuador, ya que el país necesita de estos recursos, especialmente en áreas remotas con oportunidades económicas muy limitadas, cuyos gobiernos y comunidades locales requieren infraestructura y optimización de sus finanzas. Varias instituciones centran sus esfuerzos en establecer vías innovadoras para asegurar una minería ambiental y socialmente responsable, con participación de la comunidad y la sociedad civil en el manejo y monitoreo de los impactos sociales y ambientales. Prodeminca ha demostrado a través de su trabajo en sectores de minería de pequeña escala que esto es posible si se involucra a la comunidad local en estas tareas. La consulta previa y pública, acompañada de suficiente información, llevada a cabo por el proyecto en sus principales acciones, ha permitido identificar mecanismos nuevos de participación de la sociedad civil en el manejo y toma de decisiones que pueden afectar a las comunidades, en el contexto del desarrollo minero, lo que resulta ejemplar incluso para otras industrias.

Inestabilidad política y estabilidad del proyecto.

La inestabilidad política del Ecuador afectó el plan de implementación y multiplicó los esfuerzos para explicar a sucesivas autoridades los alcances y límites del mismo. En una oportunidad (agosto 96 – febrero 97) se llegó a una discrepancia con respecto a los objetivos del proyecto y la imposibilidad de apoyar una política minera distinta de la definida originalmente. Estos factores afectaron principalmente las actividades relacionadas al fortalecimiento institucional, capacitación y difusión del proyecto, que solo se iniciaron con determinación a fines de 1998. Sin embargo, estas situaciones pudieron controlarse gracias a la relativa estabilidad de autoridades sectoriales comprometidas con los objetivos del Proyecto durante períodos comparativamente largos (por ejemplo 95-96; 98-2000), a la fuerte estabilidad de la unidad de coordinación (1995-2000) y del personal contratado, y a la presencia comprometida de las misiones de asistencia técnica sueca y británica.

Relación entre componentes técnicos e institucionales.

Durante la planeación del proyecto se previó dos partes claramente diferenciadas: una (componentes "2") relativa al fortalecimiento institucional, que en varios períodos tuvo afectaciones por la inestabilidad política, y otra (componentes "3") referida a ejemplos de aplicación técnica, en aspectos ambientales, de obtención y difusión de información geocientífica y de gestión de sistemas informáticos, asi como de asistencia a pequeña minería, cuyo avance marcó el ritmo del proyecto. Quizá un sistema de codirección en las entidades participantes en el proyecto, DINAMI y DINAGE, a fin de que sus funcionarios asuman las nuevas visiones que guiaron la implementación de los componentes técnicos, la gestión de consultores nacionales y extranjeros con mayor criterio multidisciplinario incremento sus capacidades de manejo de proyectos, habría permitido una mejor proyección para el futuro de estas entidades. De igual manera, los objetivos en aspectos como salud, debieron dimensionarse al contexto social de las zonas de intervención, incrementando la acción en aspectos generales (desnutrición, pobreza, alcoholismo) que afectan al sector rural, para que no aparezca la actuación como excluyente solo para el sector minero.

Situación general y riesgo país.

Si bien hemos desarrollado todos los elementos necesarios en el sector minero, esto es: marco legal mas seguro, mejores instituciones y un sistema de catastro transparente, mayor información geocientífica, mejor contexto social y ambiental, el principal objetivo del proyecto, lograr mayor inversión en minería, solo podrá ser medido en los próximos años. Factores como la caída de precios de los métodos y de las inversiones a nivel mundial a partir de 1997, la inestabilidad política en este período en el país, la crisis económica que aún preocupa a los inversionistas extranjeros y la falta de confianza en los órganos judiciales, completan este marco general negativo para la inversión extranjera en Ecuador. Sin embargo, en las primeras semanas posteriores a la emisión de las reformas a la Ley de Minería, importantes empresas mineras del mundo, como RTZ, BHP y Noranda, han visitado el país o han solicitado nuevas áreas mineras.

4. Seguimiento de PRODEMINCA

Actividades de seguimiento del Proyecto.

La influencia del proyecto en el desarrollo del sector, la confianza lograda por el catastro minero o por las acciones con mineros de pequeña escala, y las necesidades crecientes de gestión ambiental multidisciplinaria, llevan a considerar varias acciones posteriores al cierre de Prodeminca, para las cuales actualmente se han formulado nuevos proyectos y se busca recursos principalmente no reembolsables. Entre estas se puede mencionar:

Monitoreo de uso de la información en áreas protegidas. Esta actividad, iniciada bajo el proyecto con participación de dos ong's de alta credibilidad, ha mostrado que, en el campo, se requiere muchas mas acciones de protección ambiental, no respecto a la información generada por el proyecto o a minería en general, sino a todo lo referente a protección y mejor conocimiento de las áreas naturales protegidas. Por tanto, esta etapa de monitoreo debería complementarse con otras acciones de carácter mas general, asi como con nuevas investigaciones geocientíficas en estas zonas.

Relaciones cumunitarias y consulta previa a actividades mineras. El Ministerio de Energía y Minas ha conformado una unidad de coordinación para continuar con esta actividad, procurando una formulación concertada de una guía de relaciones comunitarias que pueda conducir estos procesos en proyectos mineros en marcha, en Ecuador. El Banco Mundial, que apoya un proceso similar para hidrocarburos, está colaborando con el MEM en este esfuerzo.

Minería de pequeña escala. Debe aprovecharse las condiciones de confianza y aceptación que deja el proyecto, para consolidar la institucionalización de los procesos alcanzados y extenderlos a áreas nuevas. Se requiere de recursos de la cooperación internacional, con enfoque al continuo mejoramiento social y

ambiental del entorno de las actividades mineras de pequeña escala, incluyendo temas como salud general y ocupacional, igualdad de derechos a la mujer y la erradicación del trabajo infantil, disminución de la contaminación por desechos mineros y malas prácticas ambientales, fortalecimiento de esquemas empresariales y asociativos que permitan un mejor aprovechamiento de los recursos, y aplicación de nuevas técnicas e implementos que permitan disminuir la contaminación, incrementar los índices de recuperación de minerales y dar mejores condiciones de vida y trabajo a los pequeños mineros, con alta participación de actores y gobiernos locales.

Gestión ambiental descentralizada. Diversos actores, tanto mineros como no mineros, coinciden en que es imprescindible fortalecer y desarrollar la gestión ambiental con participación de actores y gobiernos locales, en un proceso descentralizado que permita el diálogo y el control durante todas las etapas de actividad minera, desde la consulta previa a exploración hasta las condiciones de cierre de minas, con suficiente coordinación con el MEM. Esto supone acompañar un proceso de fortalecimiento institucional, a nivel de los cantones y parroquias con mayor actividad y/o perspectivas mineras, aprovechando la situación favorable desarrollada en torno al proyecto.

Promoción Minera. La amplia aceptación a las últimas reformas legales establecidas en Ecuador, refrendada por la presencia de tres de las principales empresas mineras en el país, a partir de 2001, obligan a realizar esfuerzos para difundir las condiciones que deja Prodeminca al final del proyecto, a fin de atraer nuevas inversiones para una minería sostenible. El MEM ha establecido un programa a cumplirse durante 2001, para difundir las ventajas e información que hoy ofrece el Ecuador.

Nuevos proyectos a partir de estudios realizados bajo el Proyecto.

Se han identificado al menos cuatro proyectos nuevos, a partir de estudios realizados por Prodeminca:

a. La ejecución del plan maestro ambiental del río Puyango, que establece propuestas de remediación ambiental por montos superiores a los 15 millones de dólares, como única opción para controlar la contaminación en los afluentes de este río, que drena el distrito minero de Zaruma Portovelo.

b. Obtención de información y condiciones socioeconómicas para el aprovechamiento de recursos naturales no renovables en la zona de frontera entre Ecuador y Perú, en las provincias de El Oro, Loja y Zamora. Fue entregado al Banco Mundial y a DFID durante esta revisión, a fin de que sean considerados para futuros financiamientos.

c. Evaluación de los recursos minerales, mediante muestreo geoquímico, en la zona de frontera suroriental de Ecuador con Perú, a fin de cooperar a un adecuado ordenamiento territorial, incluyendo la definición de nuevas áreas protegidas.

d. Mejoramiento integral de la gestión de pequeña minería metálica en la zona sur de Ecuador, considerando que ésta es una alternativa principal entre las actividades económicas de la zona.

e. Apoyo y seguimiento en la formulación y aplicación de la Guía de Relaciones Comunitarias, la que podría ser probada en varias zonas con operaciones mineras en exploración.

5. Actuación y desempeño del BIRF en el proyecto

5.1 Evaluación de la actuación del BIRF en la identificación, preparación, evaluación y supervisión del proyecto.

El Banco ha demostrado una amplia experiencia en este tipo de proyectos, con un significativo despliegue de recursos técnicos y económicos durante todas las fases de Prodeminca. La actuación del Banco fue oportuna y flexible para aceptar cambios de estrategia y ajustes durante toda la vida del proyecto.

Durante las diferentes fases del proyecto, se tuvo suficiente apoyo y colaboración de los oficiales del BIRF

asignados al mismo. Debemos destacar la presencia y constancia del Sr. Gotthard Walser, especialista minero del Banco, durante estos seis años.

5.2 Diligencia y eficiencia demostrados y técnicas administrativas, financieras y ambientales empleadas

El Banco actuó con la debida diligencia y eficiencia y de conformidad con las mejores técnicas administrativas, financieras y ambientales acordadas en el convenio de préstamo No. 3655 EC, suscrito con la República de Ecuador. El departamento de Desembolsos fue un apoyo a la Unidad de Coordinación de proyecto.

5.3 Calificación del grado de apoyo y compromiso del BIRF en el proyecto

El Banco apoyó permanentemente las solicitudes del proyecto, y las misiones de evaluación aportaron oportunamente con sugerencias que ayudaron al cumplimiento de los objetivos propuestos. Se percibió que el Banco tuvo con Prodeminca especial deferencia e interés.

5.4 Panel de Inspección

La aceptación de una denuncia de una ong poco representativa, y una larga investigación de la misma por parte de un panel de inspección, pudo afectar innecesariamente el normal desarrollo del sector minero en el país y las relaciones entre la República del Ecuador y el Banco, en especial para futuros proyectos. Si bien el gobierno de Ecuador considera objetiva y adecuada la actuación del IP, y coincide con sus sugerencias y observaciones, también cree que estas instancias deben ser muy rigurosas al calificar la representatividad y validez de denuncias que, como la presente, consideramos desproporcionada. En nuestro país, cada vez con mas frecuencia, se tiende a acudir a tribunales internacionales con denuncias que buscan notoriedad, sin mayores pruebas ni posibilidades de éxito, lo que resulta nocivo para proyectos de desarrollo.

6. Actuación de la República del Ecuador como Prestatario

6.1 Evaluación general del prestatario

El gobierno de Ecuador cumplió con los términos del convenio de préstamo, cuya participación se refleja en el éxito del proyecto y cumplimiento de sus objetivos.

6.2 Evaluación del MEM como agencia responsable de implementar el proyecto

El MEM cumplió plenamente su rol de agencia responsable de la implementación del proyecto. La estabilidad de la Unidad de Coordinación fue importante en esta gestión, lo que se refleja en el cumplimiento en cada componente del proyecto.

El proyecto deja, adicionalmente, un grupo de profesionales que han perfeccionado sus destrezas en manejo y administración de proyectos, que podría apoyar a otras actividades del Banco Mundial en el país.

6.3 Evaluación de la actuación de las entidades ejecutoras

La participación de las entidades ejecutoras ha sido variada. La reforma institucional que se realizó en el último año del proyecto, y que incluyó disminución de personal, afectó el involucramiento de funcionarios y determinó diferentes actitudes ante el proyecto. Sin embargo, de manera general, se considera que las entidades bajo la Subsecretaría de Minas, DINAMI, DINAGE, UAM, USSIM, están adecuadamente preparadas para atender al sector de inversionistas mineros con agilidad, transparencia y seguridad.

La presencia de consultores de largo aliento financiados por créditos no reembolsables que acompañaron al préstamo fue muy importante en la relación con las agencias ejecutoras.

6.4 Técnicas administrativas, financieras y ambientales empleadas y provisión de fondos, servicios y recursos según requerimientos del proyecto

Se cumplieron satisfactoriamente las técnicas y normas administrativas, financieras y ambientales que rigen la administración pública en Ecuador. En aspectos ambientales para minería, incluso realizamos actividades pioneras en el país, tanto en legislación, participación de actores sociales claves, como en monitoreo y remediación.

7. Evaluación de resultados

A criterio del gobierno de Ecuador, y de las principales empresas mineras y cámaras de producción minera, los resultados pueden calificarse como altamente satisfactorios.

Los objetivos se han logrado. A la conclusión del proyecto, se tiene un marco institucional más adecuado para el control y seguimiento de la inversión, información pública sobre sitios prospectivos, mejores herramientas para la relación con la comunidad y para el control ambiental.

En el año 2001, hemos iniciado una nueva etapa de interés e inversión de empresas mineras en el país, sin duda relacionada con las mejores condiciones logradas por el proyecto, y a pesar de que las condiciones generales recién comienzan a mejorar y estabilizarse.

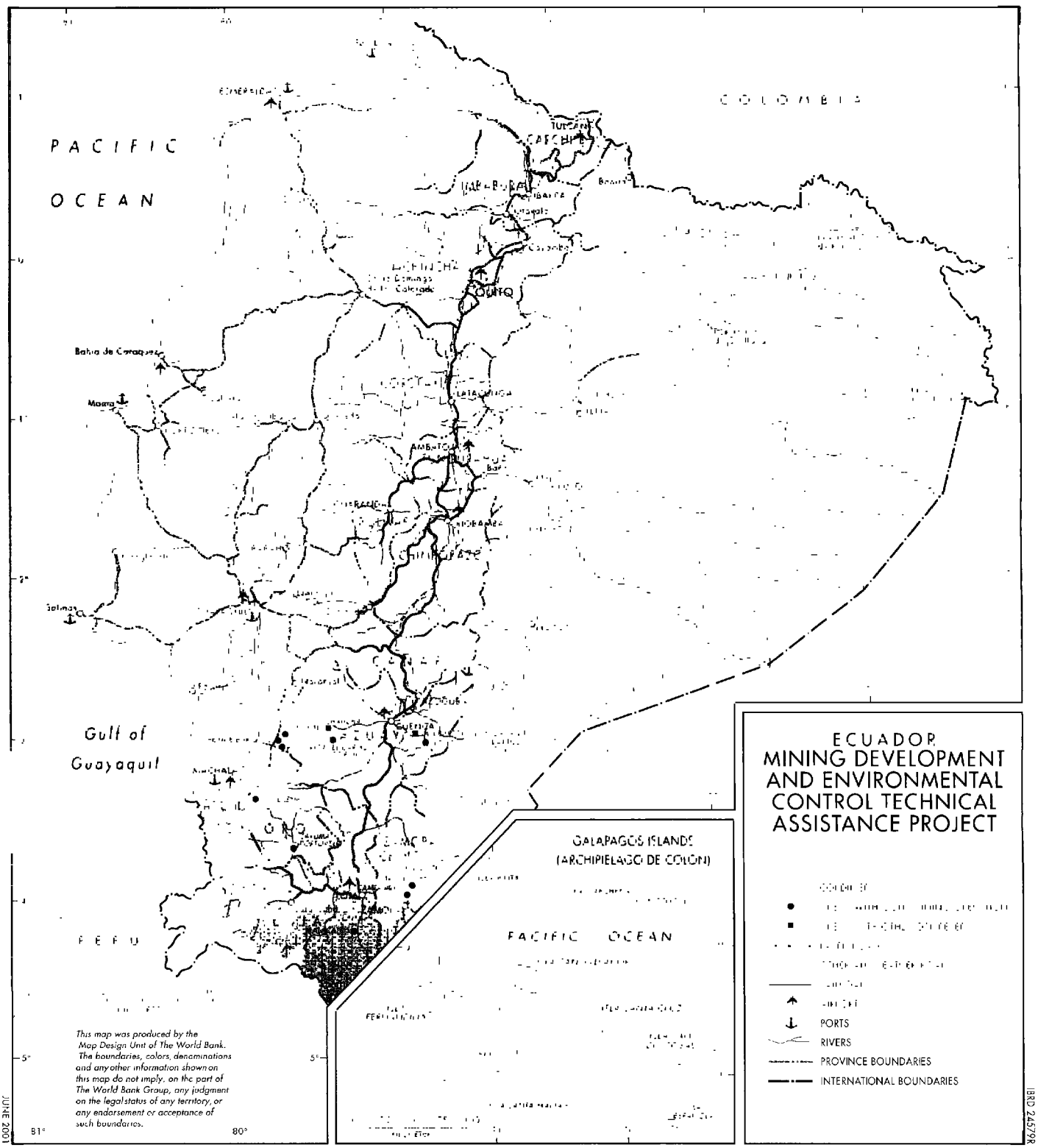
Igualmente, el prestatario ha logrado mejores condiciones de monitoreo y remediación ambiental especialmente en las zonas con pequeña minería. Existen ahora profesionales que laboran en las agencias ejecutoras con mejor capacitación en gestión ambiental, y se ha logrado comités de gestión locales en dos de los distritos en que labora la minería de pequeña escala.

Queremos expresar un especial agradecimiento al Sr. Gotthard Walser, especialista en Minería del Banco Mundial, quien con su constancia, entusiasmo y capacidad, contribuyó para el éxito de este proyecto.

Para las autoridades del Ministerio de Energía y Minas, resulta altamente satisfactorio emitir comentarios positivos respecto a este proyecto que, estamos seguros, contribuirá a la inversión minera, y con ello, a mejores condiciones de vida de la población ecuatoriana.

César Aníbal Espinosa Garcés
Subsecretario de Minas
Ministerio de Energía y Minas
Julio, 2001

MAP SECTION


PACIFIC
OCEAN
COLOMBIA
QUITO
Bahia de Caraquez
Manta
Gulf of
Guayaquil
PERU
GALAPAGOS ISLANDS
(ARCHIPIELAGO DE COLON)
PACIFIC OCEAN
ECUADOR
MINING DEVELOPMENT
AND ENVIRONMENTAL
CONTROL TECHNICAL
ASSISTANCE PROJECT
PORTS
RIVERS
PROVINCE BOUNDARIES
INTERNATIONAL BOUNDARIES
This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.
81°
80°
JUNE 2001
IBRD 24579R